..THE IRON AGE..

NEW YORK, DECEMBER 3, 1931

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TODAY'S MAINTENANCE POLICIES DETERMINE TOMORROW'S PROFITS

MAINTENANCE is particularly essential in a depression not only to protect plant and equipment from deterioration but to keep everything in readiness for business revival. The plant which is down at the heels when the returning tide of orders sets in will be severely handicapped. The repair and service departments of equipment builders cannot be asked to do the impossible.

The maintenance problem both from the point of view of current and normal conditions is outlined in the second of a series of symposiums, the first having appeared in THE IRON AGE of Aug. 20. Differences in maintenance policy here and abroad are outlined. Some companies in this country adhere to the policy of scrapping obsolescent machines every four or five years to take advantage of the economies in high production and low cost accruing from the latest designs.

IN THE IRON AGE of Aug. 20 the subject of maintenance was taken up in the form of a symposium, to which three men prominent in that work contributed. Further suggestions have been made with regard to this live and important topic, which are here summarized in a second symposium. THE IRON AGE invites comment on this subject, as one which has a large but little-appreciated bearing upon production costs and plant profits.

Influence of the Depression on Maintenance

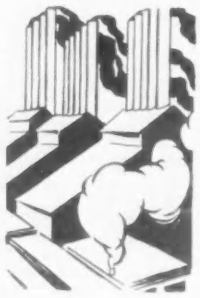
WHAT should be done under the present emergency in keeping plants up to the minute is touched upon by R. W. Walton, manager, service department, Shepard Niles Crane & Hoist Corpn., Montour Falls, N. Y., who contributed also to the discussion of this question in THE IRON AGE of Aug. 20. His comments are covered in the paragraphs which follow.

As business began to decline some time ago plants began to cut expenses. Repairs on old equipment were deferred for a more convenient time. As a result, many plants went into the real depression with much of their equipment in poor condition.

Departments—in many cases, practically whole plants—have been shut down. Equipment which needed repairs before the shutdown has been standing idle. This has added rapidly to the deterioration, for idleness rusts out machinery fully as rapidly as it is supposed to rust out men.

No one who has any faith in the progress of civilization can doubt that business will eventually pick up. Mankind's demand that the resources of nature be transformed into human comforts will be as insistent in the future as in the past. He who can take the returning tide at the flood will be fortunate, indeed. But the man whose plant is down at the heels when the returning tide of orders sets in will not be so comfortably situated.

Stocks are low, and returning business will call for instant delivery. The plant in good repair, equipped to make prompt shipment, will have the advantage over any not in such good shape. The repair and service departments of equipment builders are



going to be asked to do the impossible—and some disappointments are sure to occur.

As an example: A foundry recently telephoned for major repairs on a piece of rather old equipment. When told that immediate shipment was impossible, the foundry manager was frantic. He said: "We have just received a little business, and it is precious. We simply must do something." By means of substitutions, this company was helped out of its predicament, but at considerable extra expense. The type of breakdown showed conclusively that the failure was the result of deterioration extending over a long period of time.

Some Emergency Calls Can Be Met—Some Not

On a Saturday morning between 11 and 12 an equipment builder received three emergency calls. One was satisfied by a large express shipment; one by a substitution of material, the delivery of which necessitated a long, night truck trip. The third call simply could not be filled immediately—equipment builders cannot pick castings out of the air; neither can they always have on hand repair parts for all the machinery they have built over a long period of existence.

Undoubtedly times are hard. Business is dull—possibly in some cases almost non-existent. Industry is disorganized. There is a sad dip in the period of prosperity. But nature's resources are still at hand.

Men by the millions still desire comforts. Unless we have lost our ability, industry and courage we shall soon be climbing up the steep incline on the other side of the dip in the curve. And we shall again receive those gracious guests called orders. If we delay necessary housecleaning until the guests arrive, however, we are sure to be embarrassed.

Not All People Think Alike

CONTRASTING and divergent views of people in different circumstances are brought out by Sidney Watkins, electrical engineer, Warner & Swasey Co., Cleveland, much of whose letter follows. This expression is of particular interest as indicating the effect of habits of thought upon a problem which is partly mechanical and partly economic.

It is evident that there is a wide diversity of opinion upon the subject of the value of the maintenance of equipment, Mr. Watkins writes. We read that in Russia new machinery is put into service and operated without regard to maintenance, until it quickly becomes a total wreck. In contrast with this practice, in France and Germany machinery is so well taken care of that machines giving constant service for 20 or 30 years are not at all unusual.

In this country it is the practice in some of the large plants to scrap a machine whenever a new one is developed which will do the work better or at less cost. This is done, regardless of the length of time the machine has been in service. The Westinghouse Electric & Mfg. Co. is reported to have come to the conclusion that it is economy to scrap the ordinary line of machine tools after four years of service, and replace them with those of the latest design.

A number of companies and many individuals appear to find it economical to turn in their automobiles after one year of service. These instances are but outstanding examples of the different attitudes taken by individuals upon the value of maintenance.

[Here may be noted the recent suggestion that automobiles and other equipment be designed deliberately for a definitely limited life. After running for this shortened period, the demand would be there for a new unit. Benefits claimed are a lower average life of the units in use, with consequent higher general efficiency of operation. Through larger demand for new units, the benefits to industry are obvious.]

Making Fool-Proof Equipment

There is a strong tendency among manufacturers today, Mr. Watkins says, to produce machinery which will be free from the need of maintenance. The domestic electric refrigerator field is a well-known example of this. The forced-feed oiling systems put upon nearly every kind of machinery form another example. The splash and one-shot lubricating systems and the extensive Alemite systems are other cases in point.

With the application of one or more of these lubricating systems it would seem that one of the most important maintenance problems—proper lubrication—would be solved. Perhaps this would be true if the old standards of speeds and feeds still prevailed. But these have not remained stationary. In many types of machinery the speeds and feeds have been doubled, and in some cases trebled, so that the problem of maintenance assumes increasing importance.

In certain types of machines it is not only a question of getting oil to the wearing parts. It is a problem to find a lubricant which will prevent excessive heating at the high rate of movement adopted. There has been much experimenting with mixtures of oils and water, together with fans and radiators and refrigerating units, in attempting to lubricate high-speed machinery and prevent excessive heating.

Need Real Engineering Talent

With all the attention given to the question of maintenance by designing engineers, it would seem that the result, so far, has been to create a demand for a higher type of maintenance man, rather than to eliminate the need of maintenance. With the varied and increasingly complicated equipment required in many industries today, it would seem a logical conclusion that the demands and opportunities of the maintenance department would warrant the attention of skilled engineers, rather than

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leave the matter to the "handy man" around the plant.

Along with the realization of the need of engineering skill in the maintenance department, the question of utilizing this skill in the selection of new equipment for the plant can be approached on a more intelligent basis. It is reasonable to believe that a skilled engineer, who has come into close contact with all kinds of equipment in operation in the industry, will be a valuable asset to the management—not only in the selection of new equipment, but also in helping to solve some of the problems in the design of such special machinery as may be required.

Practical Ways of Handling Maintenance

QUITE a different phase of the subject is taken up by H. S. Jacoby, secretary and chief engineer, H. K. Ferguson Co., also of Cleveland. He makes a number of worthwhile suggestions as to the steps desirable in carrying out a maintenance program. Principally, he recommends acquiring a thorough knowledge as to all particulars of the equipment to be maintained. His views on this topic are set forth in the following paragraphs:

A card index should be kept of all motors and machines. This should show a complete purchase record and detailed inspection record. It should give the dates of last cleaning, last painting, when repaired and what repairs were made. The probable life of the machine and expected replacement date should be specified.

As to the buildings, the inspection cards should show when each department was last painted, its condition on inspection and the suggested date or dates for such repairs as are recommended.

Careful watch should be kept on the structural frame of the building, with regard particularly to the overloading of floors. The floor wearing surfaces should be watched, and minor repairs made at once.

Steel sash should be inspected for rust and should be kept well painted. Roofs should be well inspected, and careful record kept of any roof guarantee which may have been made.

Accurate Layout of Pipe Lines Essential

All piping and valves should be watched for rusting and possible need for replacement. The heating system should be gone over during the summer, all traps opened and cleaned, pipe work painted where necessary, boilers cleaned and worn tubes replaced. The sprinkler system should be inspected, and special attention given to the sprinkler tank for leaks or rust spots.

An accurate plan should be kept of all underground piping and sewers so that, in case of trouble, repairs can be made quickly. This is very important, because quick repairs many times save big losses in damaged stock. [Incidentally, such an accurate plan will be of great benefit in case it becomes necessary to add to the underground system. It would make it easy to plan extensions without danger of running into some line already in place, but whose location had been forgotten.]

MACHINING PARTS FOR CONTI NE

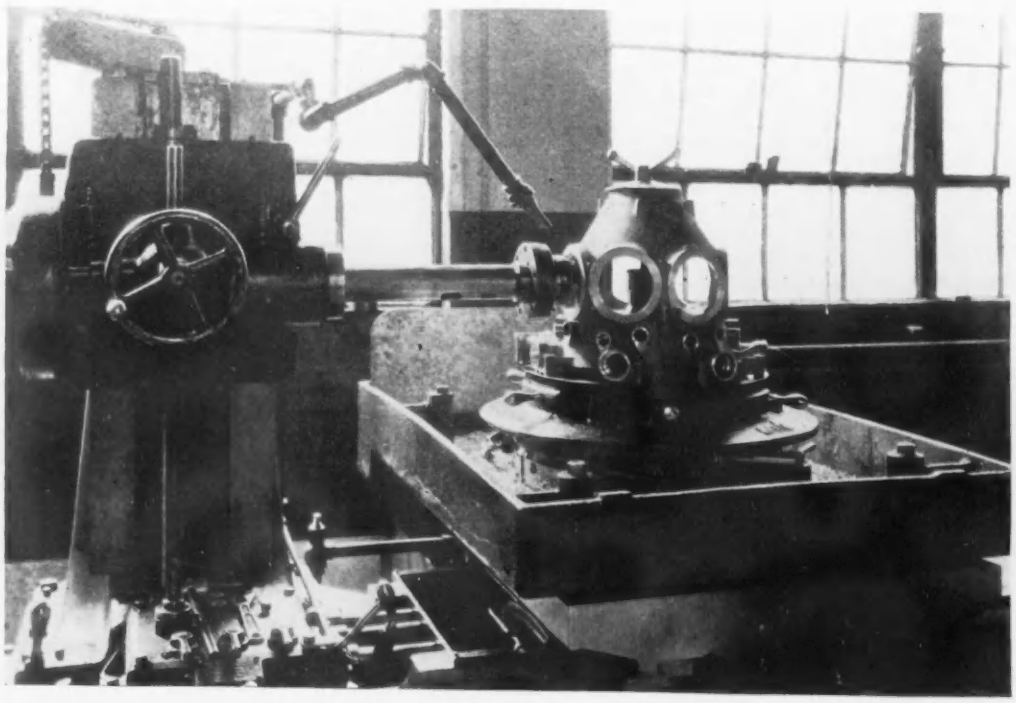
By BURNHAM FINNEY
Detroit editor,
THE IRON AGE

COST reducing methods have been reconciled with the requirements of a flexible production program and the maintenance of high standards of accuracy and reliability at the plant of the Continental Aircraft Engine Co., Detroit, subsidiary of the Continental Motors Corpn. Full advantage has been taken of the economy-yielding possibilities of modern machine tools; yet the machines are of standard design so that the change-overs required for the manufacture of new engine models can be made with minimum expense.

The company produces a seven-cylinder air-cooled engine of radial type. Designated as the model A 70, it develops 165 hp. at 2000 r.p.m. The cylinders have a $4^{5}/_{8}$-in. bore and a $4^{5}/_{8}$-in. stroke, and the total piston displacement is 544 cu. in. The cylinders consist of a forged carbon-steel barrel on which heat-treated aluminum heads are screwed and shrunk. The barrel bores are ground to between 4.624 and 4.625 in. for a length of $8^{1}/_{4}$ in. Each cylinder unit is attached to the crankcase by means of 10 studs and nuts. All cylinders are mounted on the crankcase in the same vertical plane within close limits.

The crankcase consists of two heat-treated aluminum alloy castings joined on the center lines of the cylinders. The front part has a ball-thrust bearing and a roller bearing for the crankshaft and the rear part has a roller bearing. The roller bearings are mounted in bronze liners and the thrust bearing in a steel retainer. The crankshaft is made up of two heat-treated chrome-nickel steel forgings which are joined by clamping the crankpin of the front part into a ground hole in the cheek of the rear part. The double construction makes possible the use of a one-piece master rod with integral crankpin bearing, said to have greater strength, longer life and less weight than a split rod bearing.

Crankshaft parts are machined all over to assure accuracy, balance and minimum weight, and to detect flaws. They are drilled to reduce the weight and to provide passages for delivering oil to the crankpin and link pin bearings. Counterweights are



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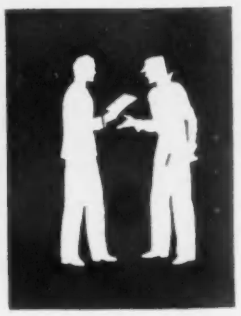
CYLINDER pads on the crankcase are bored and faced on a Lucas horizontal boring mill.



NTI NENTAL AIRCRAFT ENGINES

STEPS in machining the crankcase, crankshaft, connecting rods, pistons, cylinders, cylinder heads and other parts of the Continental radial-type aircraft engine are outlined in this article. Modern machine tools are employed, and rapid economical production, as well as high standards relating to material and workmanship, feature the manufacture of these engines.

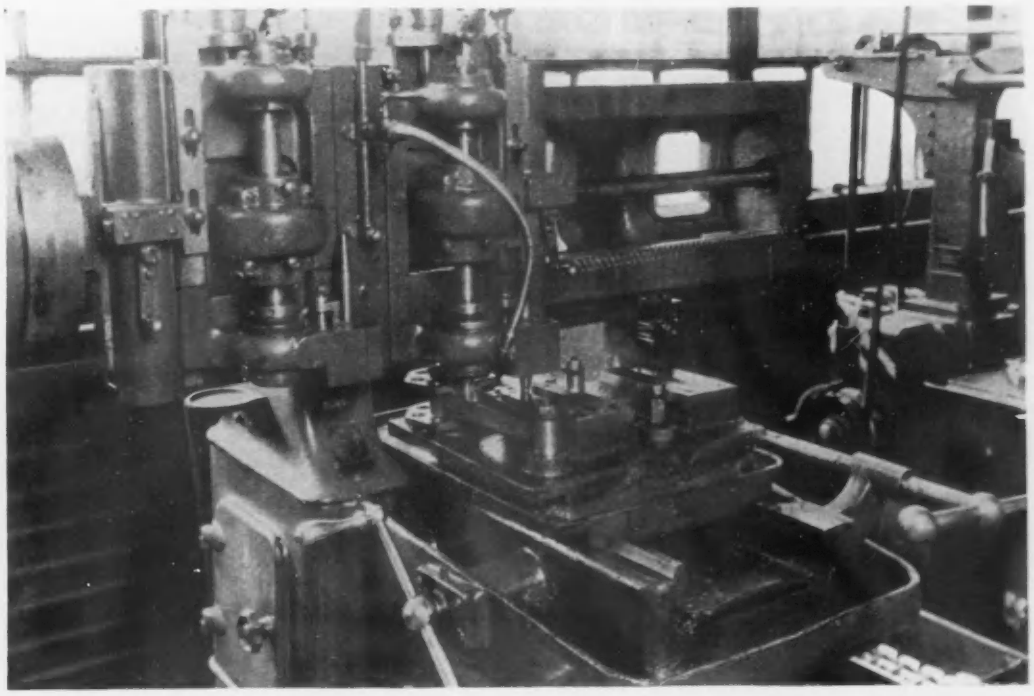
riveted to the crankshaft. The master connecting rod and articulated rods are of heat-treated, chrome-vanadium steel forgings, completely machined, with blades of H-section. Pistons are aluminum alloy castings of plain cylindrical type, with three grooves above and one below the piston pin. All accessory drive gears are forged integral with chrome-vanadium steel shafts. With the exception of the helical pump gears, they are of the spur stub-tooth type.

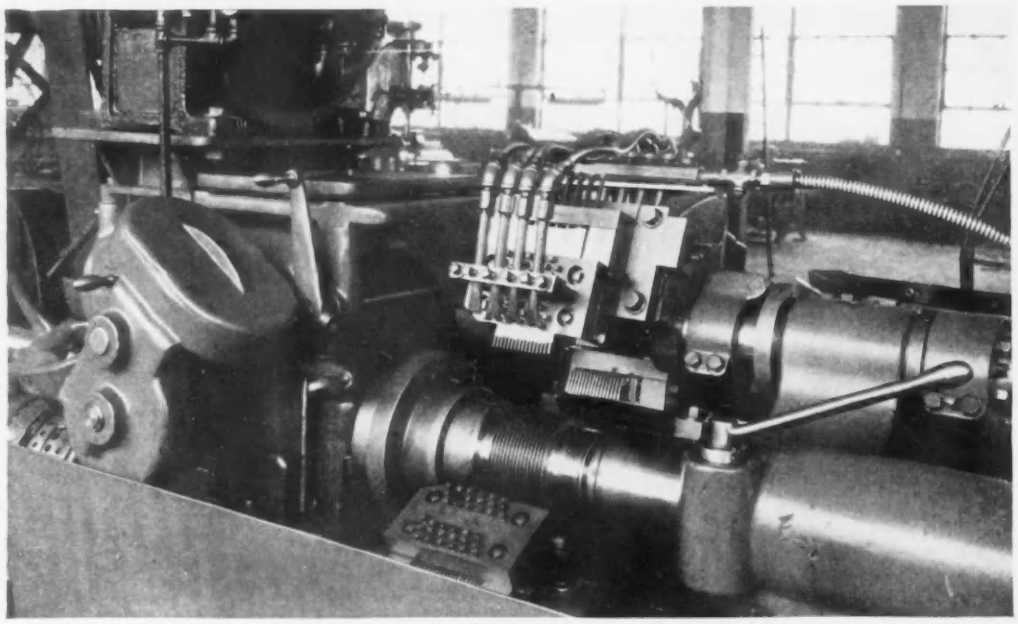
Crankcase Halves Machined on Bullard Vertical Lathes

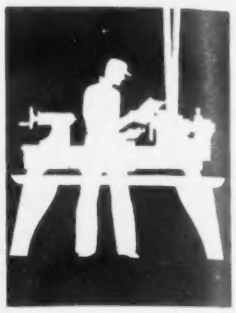
The two halves of the crankcase are machined and the flange for accommodating the accessory housing is turned and faced on Bullard vertical turning lathes. Holes are drilled in the flange and accurately spaced in a special fixture designed for this purpose. After this machining operation the liners for the main bearings are pressed in place and the two parts of the crankcase bolted together. The work then is put on a Lucas horizontal boring mill equipped with a fixture indexed into seven different positions for machining the cylinder and intake holes and into 14 other positions for finishing the valve tappet guide holes. On this machine the cylinder openings are finished, tappet guide holes are drilled and reamed, bosses for accommodating intake pipes are machined and intake manifold pads are finished. Five of the tools are used on the 14 valve tappet guide holes and three on the seven intake holes. Roughing and finishing cutter-heads are used on the cylinder holes for taking facing and boring cuts. Mounted on the boring arm, a dial indicator facilitates taking the different cuts to the proper depth. This machine can handle one crankcase an hour.

Four holes in the crankcase are rough bored and finish bored on a Rockford drilling and boring machine. Both halves of the crankshaft are rough turned on Fay automatic machines which finish all

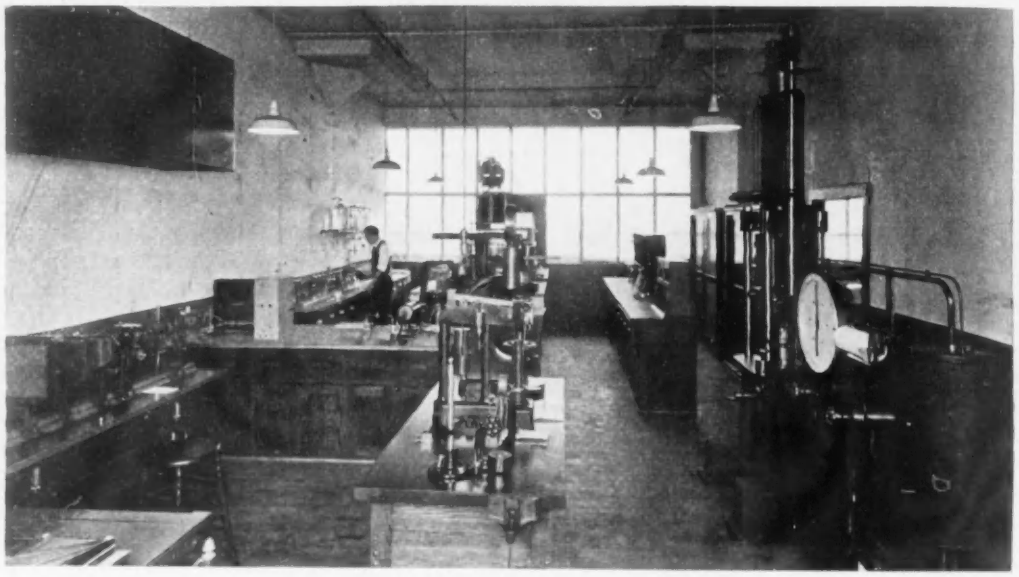
MILLING channels in solid blade of a master connecting rod. This machine with suitable fixture and template is used for profiling intake and exhaust pads of manifold.



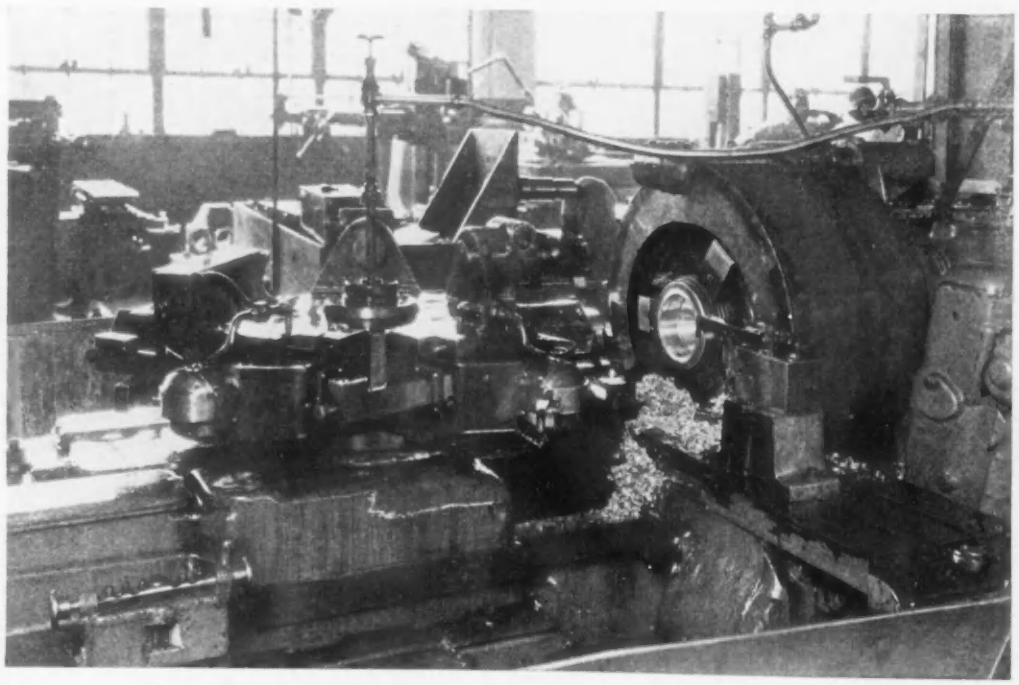




FAY automatic lathes turn the cooling fins on the periphery of the steel cylinder barrels.



METALLURGICAL laboratory equipment includes a 100,000-lb. Amsler testing machine.



MACHINING spherical combustion chamber in aluminum alloy cylinder heads on a Potter & Johnston automatic. The spherical surface is rough and finish bored by using cutters swiveled to suit radius of surface when turret is fed into the work.

of the various contours simultaneously. The crankpin hole is drilled in the cheek of the rear half of the crankshaft, and the counterweights are completely machined on other automatic tools.

The cam ring and rear assembly are turned on Potter & Johnston machines. Cams are milled on a special attachment for a Cincinnati miller. They are hardened in a special fixture to prevent distortion.

Both master and articulated rods are milled on all sides by Kearney & Trecker millers. The channels forming the H section are cut out on a Leland & Gifford machine. The end mill used in this operation is guided in the channels of the connecting rod by means of a pilot along which a templet on the table is moved by turning the table handwheels. This type of machine also is used for profiling the intake and exhaust pads of the manifold.

Bronze bushings are pressed into the ends of the articulated rods as well as in the piston pin end of the master rod. The lower crankpin bearing of the master rod is of steel with a babbitt lining. All of the bushings are diamond-bored.

Cylinder heads undergo careful processing. The combustion chamber, which is of spherical shape, is machined on Potter & Johnston special lathes. Valve guide holes and valve seats are machined on a special tool designed by Continental engineers. Internal threads then are cut in the lower end of the head on a Hanson-Whitney thread-miller.

Cylinder Fins Machined on Fay Automatic

Cylinders are bored and their lower flanges turned in one operation on a Potter & Johnston machine. The cylinders then are placed on Fay automatic lathes, which turn all fins on each cylinder in a single operation, about 9½ lb. of metal being removed from the cylinder in 4 min. This machine has three sets of tools. One set cuts the fins straight down to depth, a second cuts them slightly tapered on one side and a third cuts the taper on the opposite side. Each set of tools begins its work after the preceding set has a lead of 0.010 in. in order to prevent distortion. The fins are 3/64 in. thick and 5/8 in. deep. There are 16 fins on each barrel.

To certify the quality of material going into the various parts of the engine, the company maintains a metallurgical laboratory which is devoted also to research in metals suitable for aircraft engine purposes. Its equipment includes an Amsler strength testing machine of 100,000 lb. capacity. Housed in a separate structure is a testing department equipped with dynamometers and other equipment for either complete or single-cylinder engine research. In addition, a series of production test stands has been provided for regular routine tests.

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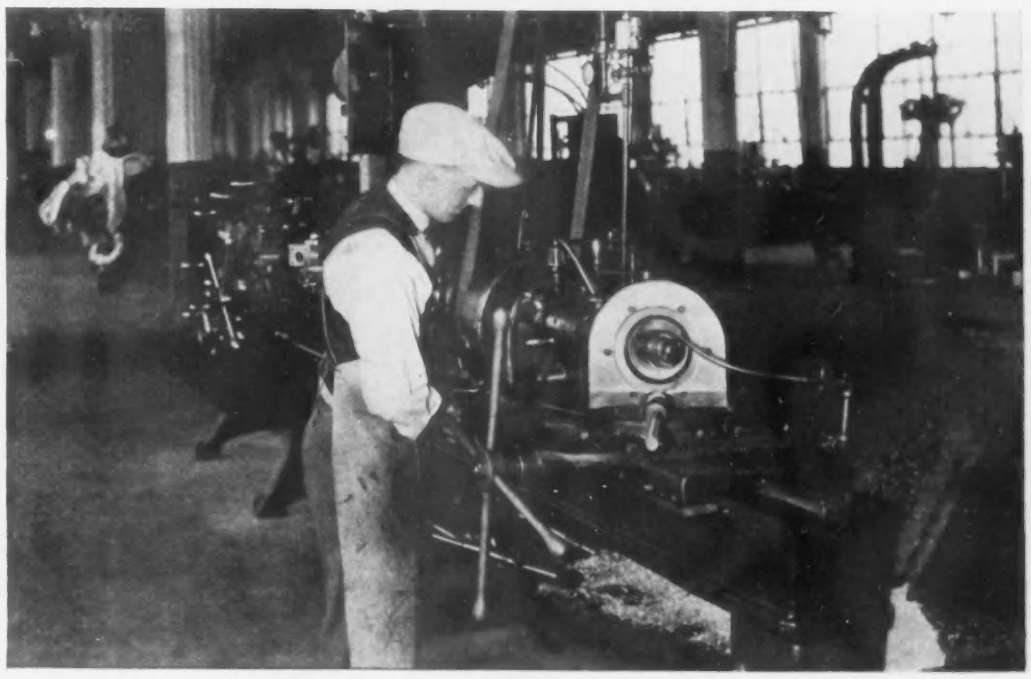
SPECIAL attachment on turning lathe for machining valve guide holes and counterboring for valve seats.



IN connection with a study of the mechanism of the galvanizing process, H. Grubitsch has determined the solubility of Armco iron of the composition 0.011 C, 0.002 Si, 0.017 Mn, 0.005 P, 0.028 S, 0.03 per cent Cu, in chemically pure zinc under a nitrogen atmosphere (*Stahl und Eisen*, Sept. 3, 1931). Prior to test, polished cylinders of the sheet iron were pickled and galvanized to afford uniform wetting of the liquid zinc in the solubility determinations.

The quantity of iron dissolved in small samples of zinc increases very slowly from the melting point of zinc to 890 deg. F., above which temperature the solubility increases rapidly to a maximum at 920 deg. and the effect of time on concentration of iron is very marked. Curves (shown by the author) then drop off to minima at 960 deg. F., above which temperature the solubility increases steadily, little affected by time. Curves of similar shapes resulted when the quantity of zinc was increased.

STRIP AND SHEET ANNEALING IN FURNACE WITH

By WIRT S. SCOTT
Special representative
Westinghouse Electric & Mfg. Co.,
Mansfield, Ohio

FOR bright annealing of iron and steel strips and sheets, the electric furnace, with artificial atmosphere control, has made it possible to accomplish astounding economies.

Cost Comparison with Electric Furnace

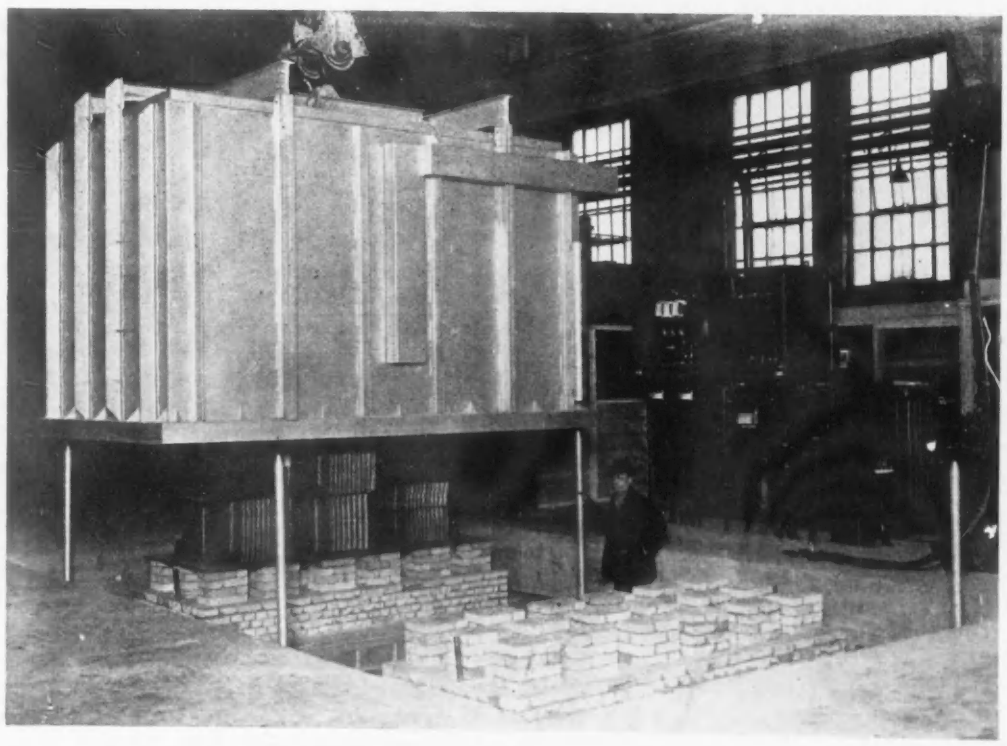
IN one large plant an initial installation was made, consisting of a cylindrical bell-type Westinghouse electric furnace, which resulted in one of the largest electric furnace orders placed to date. Tests and investigations extending over a period of two years enabled this company to arrive at accurate comparative results, and definite dollar savings per ton of product.

From experience thus far gained in bright annealing of sheets, strips and wire, the total savings which may be expected today, using electric furnaces, may be estimated to be somewhere between $1.50 and $3.50 a ton, depending upon local conditions and the application.

In addition to the dollar savings, as above discussed, there are definite savings from the reduction or (probably) total elimination of certain difficulties constantly confronting the users of fuel-fired furnaces.

Uniform Heat Treatment

It has been possible, by means of correct design, so to locate the heating elements, and to distribute the generation of heat, as to compensate accurately for all inherently hot or cold spots within the furnace, so as to maintain a uniform flow of heat to the charge from all directions, bringing the entire charge up to a predetermined temperature every time, elimi-



ELECTRIC bell-type furnace as originally constructed and used in experimental work. The rectangular "bell" is about to be lowered over the charge of sheet steel. The upright posts are to center the furnace in a definite position. The bell, weighing 40,000 lb. is handled by overhead crane. Two bases were supplied so that the bell could be removed from one charge and immediately placed over another charge.

THE ELECTRIC ATMOSPHERE CONTROL

A STRONG case for the use of electrically-heated furnaces is built up by Mr. Scott in his article, of which this is the first of two installments. Comparisons taken from practice are drawn upon to show how important modern equipment is in this work. Control of the atmosphere in which annealing occurs is particularly vital if results are to be satisfactory.

nating all over or under heating. A uniform annealing temperature throughout the charge, and a controllable annealing temperature (depending upon the product) will place the material in the proper physical condition for the subsequent cooling cycle.

Parts of the charge which never reach the proper annealing temperature, say by 100 deg. F., will cool quicker than they should, which again affects the finished anneal. Likewise, parts of the charge which are overheated will be slower in cooling, again affecting the quality of product. With an electric furnace, these conditions are capable of being regulated to a scientific decree of accuracy, and in a most simple manner, since it becomes a function of the electric furnace design, and not a condition which is within the hands of an operator to attempt to secure.

It is difficult to say how much it may be worth to a steel company to obtain a uniformly high-grade annealed product each and every time, eliminating the rejects and the reannealing due to an improperly heat-treated product, also to sheets or strips stuck together. This will vary greatly, depending upon the type and grade of product produced. The elimination of such rejects and the improvement of the quality should be worth from 50c. to $1 a ton.

Discolored Surface to Be Avoided

SOLVING the problem of discolored surface in annealing sheet and strip steel has been a most difficult undertaking. It has been accomplished only by a vast amount of research work in the chemical and metallurgical field, and at great expense. A

BRIGHT annealing fuel-fired furnaces, in a large-production plant. The cast iron annealing boxes are run into the furnace on large cannon balls, seen in groove in nearest furnace.

discolored surface may result from a number of conditions, which may be outlined as follows:

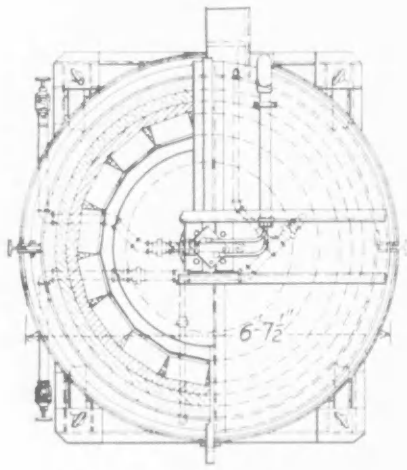
Air, which is a mixture of approximately four parts nitrogen and one part oxygen, will, even in exceedingly small quantities, cause oxidation, particularly on the cooling cycle, resulting in discoloration. Small amounts of air result in oxidation around the edges of sheets, necessitating an excessive amount of trimming to eliminate such parts from the finished stock. By use of a properly designed electric furnace, it is possible to remove all the air from the container, and to keep it out during the heating and cooling cycle by passing an appropriate gas through the container.

Oil and grease on the work when going into a bright annealing process will result in carbon forming on the surface, causing a discoloration difficult to remove. In some instances, it may be difficult to have such foreign material removed from the work before annealing. Where such conditions exist, it is possible to use a gas for atmosphere control which will combine with the carbon and remove it from the charge.

Excess of hydrocarbons in the atmosphere control gas will cause carbon deposits to form on the work. These are very difficult to remove, and, in fact, defeat the effect of bright annealing. Carbon deposits may even cause carburization of the surface. This can be controlled by the use of an appropriate gas.

Moisture Likely to Cause Trouble

Small quantities of moisture in the atmosphere control gas will cause tarnishing of the work as it passes through a certain range in temperatures, even though it may not cause discoloration at a higher temperature. Iron will tarnish at about 750



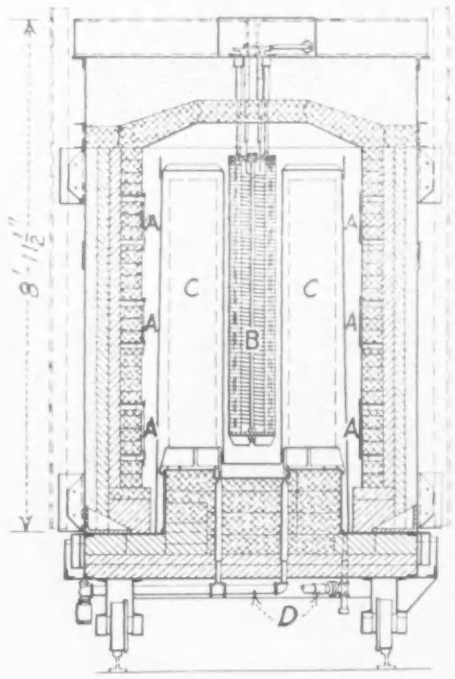
Half-Section Half Top View

AT LEFT

LATEST design used for continuous annealing of coil strip steel. Each unit consists of a cylindrical bell furnace and five bases. Each base is mounted on a truck, the five bases arranged on a circular track. Permanent pipe connections are built into each base to provide the entrance and exit for the atmosphere control gases.

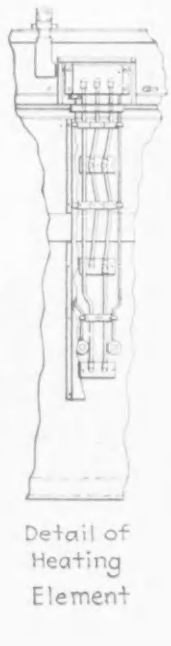
BELOW

WHEN experiments were being made at the Westinghouse East Pittsburgh plant, a United States Steel Corporation plant was experimenting with a furnace of the cylindrical bell type for bright annealing strip iron and steel. The exterior of this furnace is shown here. This furnace can accommodate a charge of coiled strips or wire of 7000 lb., 36 in. in diameter and 56 in. high.

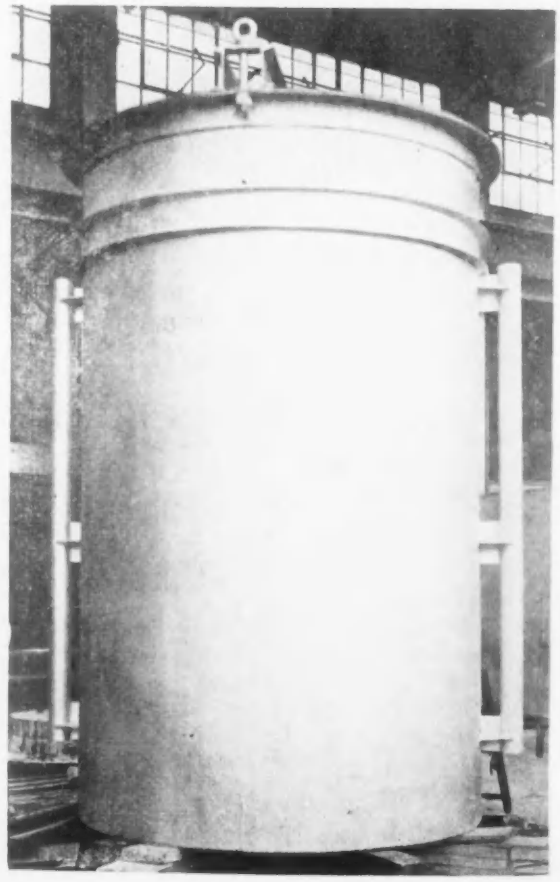


Vertical Section

A = Heating Elements
B = Internal Heater
C = Work Being Heated
D = Connections for Control of Atmosphere



Detail of Heating Element



An annealed charge being removed from the base, after the cover has been lifted off.

deg. F. in an atmosphere of hydrogen containing but minute fractions of 1 per cent of water vapor. Again, the presence of carbon monoxide in small amounts increases the permissible moisture content and thus somewhat simplifies the problem of drying the atmosphere-control gases. However, should it be required, means have been developed for drying hydrogen so completely that it will not tarnish pure iron while cooling.

If an oxide is allowed to form on an iron or steel surface during one portion of the annealing cycle, and if this oxide is subsequently reduced to metal, the resulting surface will have a bright finish, but its chemical character is likely to differ from that of a surface which has never been oxidized. This peculiarity may give trouble due to corrosion following pickling. The exact character of this chemical change has not yet been completely defined, but it probably arises from sponginess of the surface layer of metal produced by the reduction of the oxidized surface.

As a general principle, it should be recognized that oxidation should not be allowed to occur at any stage of a bright annealing cycle. This, again, is

(*Concluded on page 32*)

EVENTUALLY it was found necessary, for producing certain results, to use an inner hood or cover for the charge. This cover is made of nickel-chromium sheets, welded together, ribbed, and braced to maintain a rigid structure. This cover is sealed in a liquid, utilizing the same seal as with the furnace bell. Two such covers are used (one is under the bell, at left) to provide for continuous production.

HOW A LARGE TRACTOR COMPANY C

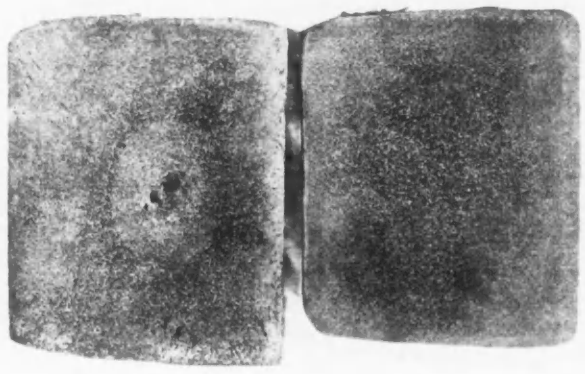
ASSERTING that chemical analysis alone is not sufficient as a test by which the user can be assured of uniform quality of material, the Caterpillar Tractor Co. has adopted several other tests which such material must meet. It has confined its specifications to minimum qualities after abandoning the idea of average quality as non-representative. The tests prescribed are outlined in this article. After four years' experience in using such tests the company has found 90 per cent of the material offered acceptable.

WHILE it is recognized by many large users of steel that no specification based upon chemistry alone is sufficient to assure uniform quality from bar to bar, or piece to piece, especially when subjected to precise heat treatment, yet no great amount of information has been published as to what supplementary tests have been added to the S.A.E. or other recognized standards, for obtaining uniformity of quality.

There are such striking differences between mill heats, made to the same narrow chemical range, and between the maximum and minimum qualities of the same mill heat, that the Caterpillar company has long since abandoned the idea of average quality, and has confined all specifications to the minimum qualities, choosing test locations most likely to reveal such minimum qualities.

It is rather well known that the first and last steel poured tends to be furthest from the average, both in analysis and quality. At the same time, the top and bottom of an ingot tend to be furthest from the average ingot quality. Also, the axial center of an ingot, as well as the same location in the rolled product, tend to exhibit an extreme of quality.

Thus, S.A.E. No. 1045 can exhibit a nominal vari-



(A) (B)

BAD and good macro-etch of full section of blooms.

(A) Inferior quality, gas holes and general unsoundness.

(B) Sound, uniform texture, good quality.

▲ ▲ ▲

Caterpillar Tractor Co., Peoria, Ill.

CLEANLINESS CHART

(At Left) CLEANLINESS CHART: Magnification, 100 diameters, unetched. Good quality steel rarely exceeds No. 4.

CONTROLS QUALITY OF PURCHASED MATERIAL

By G. C. RIEGEL
Chief Metallurgist
Caterpillar Tractor Co.
Peoria, Ill.

ation of 11 points in carbon and, by arbitration check, as much as 13 points. The manganese may vary 31 points nominally, and by check, up to 35 points. Such extremes are possible from the product of the same heat! But, as difficult as it is to finish the extremes of such a mill heat, made into a multitude of small forgings, to precise physical properties by heat treatment, the greater difficulty lies in the non-uniform response of the same forgings from several different mill heats of quite similar chemistry.

Thus, the ladle analysis of one mill heat may show 0.44 per cent carbon, 0.56 per cent manganese, and the other 0.45 per cent carbon, 0.59 per cent manganese; yet the latter may show a very shallow hardening, non-uniform surface hardening varying as much as eight points Rockwell "C," and an inferior shock resistance as measured by the Charpy impact test, while the former might pass all such tests adequately.

After approximately four years of experience in procuring alloy and carbon steels according to Caterpillar specifications (outlined below), covering slightly over 1000 mill heats (about 80,000 tons), 90 per cent of the material offered has been found acceptable. Out of this experience it may be stated, therefore, that:

1.—Narrow chemical analysis alone is inadequate to protect the consumer from quality vagaries, particularly in heat treatment.

2.—Physical characteristics, such as minimum hardness, maximum spread of hardness, uniformity of depth of hardness, strength, and shock-resistant qualities, micro and macrocleanliness, freedom from minute ruptures, or "bursts," are some of the qualities which should be known by testing samples from the locations in a mill heat most likely to reveal these

CATERPILLAR TRACTOR COMPANY
MATERIAL DISPOSITION REPORT
PLANT, PEORIA

TO PURCHASING DEPARTMENT
ATTN:
COPIES TO

Mill	Forge Co.
EXEMPLAR STEEL CO.	APPROVED FORGE CO.

DISPOSITION DATE 10-20-51
VENDOR EXEMPLAR STEEL CO.
HEAT NO. G-1951
SIZE 8 x 6-1/2
S.A.E. NO. 1045
FOR SHIPMENT TO Stock
INTENDED FOR 1826 OR 1828

SAMPLES TESTED: "A","Z","D",& "B"
DISPOSITION: ACCEPTED FOR 1828 ONLY
LAB. REPORT NOS.: P-1007-1008-1009-1010
DATE TYPED: 10-21-51

TYPE OF TEST	NORMAL	QUESTIONED
Chemistry		CARBON AT MAX. ON "Z" & "D" SAMPLES
Deep Etch	#	
Cleanliness	#	
Hardness	#	
Impacts		TWO SPECIMENS SLIGHTLY LOW ON "Z" SAMPLE
Tensile Strength	#	
Elongation	#	
Red'n. of Area		ONE SPECIMEN AT MINIMUM
Retests		NONE

C.T.CO.
Metallurgical Department

NOT APPROVED APPROVED

Flow lines of sections of large gear, improperly and properly forged.

CATERPILLAR Tractor Co.'s material disposition report for Peoria plant.

minimum qualities, assuming that such is representative of the worst that will finally be used.

3.—Identification of the product of all mill heats.

4.—A steel source, capable, conscientious, and willing to provide such quality control, is obviously required but not everywhere available. This requirement is also extended to include an inventory of acceptable heats on hand at the mill.

Typical Tests for No. 1045 Steel

The following tests are cited as typical for S.A.E. No. 1045 steel:

1.—Billet or bloom samples from the bottom of the first ingot after the usual discard, in like manner from the top of the last ingot of a mill heat.

2.—Hot acid or macroetch of full section from these samples. (See illustrations.)

3.—Correct chemistry, even at center.

4.—Microcleanliness (See chart).

5.—*Minimum* physical characteristics:

(a) Hardness "as quenched," ½ in. sq., e.g. Rockwell [illegible] 50.

(b) Charpy impact, e.g. 800 deg. F. 1 hr. draw, ft. = lb. 12.

(c) Tensile strength (⅞ in. dia. water quench) 120,000 lb.

(d) Quality factor [reduction of area = 89.99 — (0.302 × 1000 lb. tensile strength].

The specifications for alloy steels are similar to those for carbon steels, but somewhat more elaborate, and of course correspond to the alloy type. Steels bought to such specifications naturally are subject to extras.

Disposition of Mill Heats

The steel source, having first satisfied itself that these specifications have been met, must await a material disposition report (see illustration) at the completion of similar tests by the Caterpillar Company, showing acceptance and application before a heat may be rolled on our orders.

Application of a mill heat is based upon the physical characteristics of a theoretical 5-point carbon range. The carbon may or may not be within the exact range. Thus, ladle and extreme analyses may show the carbon 0.43 to 0.48 per cent, and yet the heat classified for use in a nominal (0.40 to less than 0.45 per cent) application.

This one method of choice is far more effectual in simplifying the problems of the heat treater than mere chemical selection based on even narrower carbon limits. For example, a forging made from 0.48 per cent carbon steel may not respond as well to normal hardening as another made from a 0.43 per cent carbon steel. To have established the heat treatment, in such an instance, wholly by a carbon range, e.g. (0.47 to 0.50) and (0.40 to 0.43) would have resulted in non-uniformity of hardness, or a production delay.

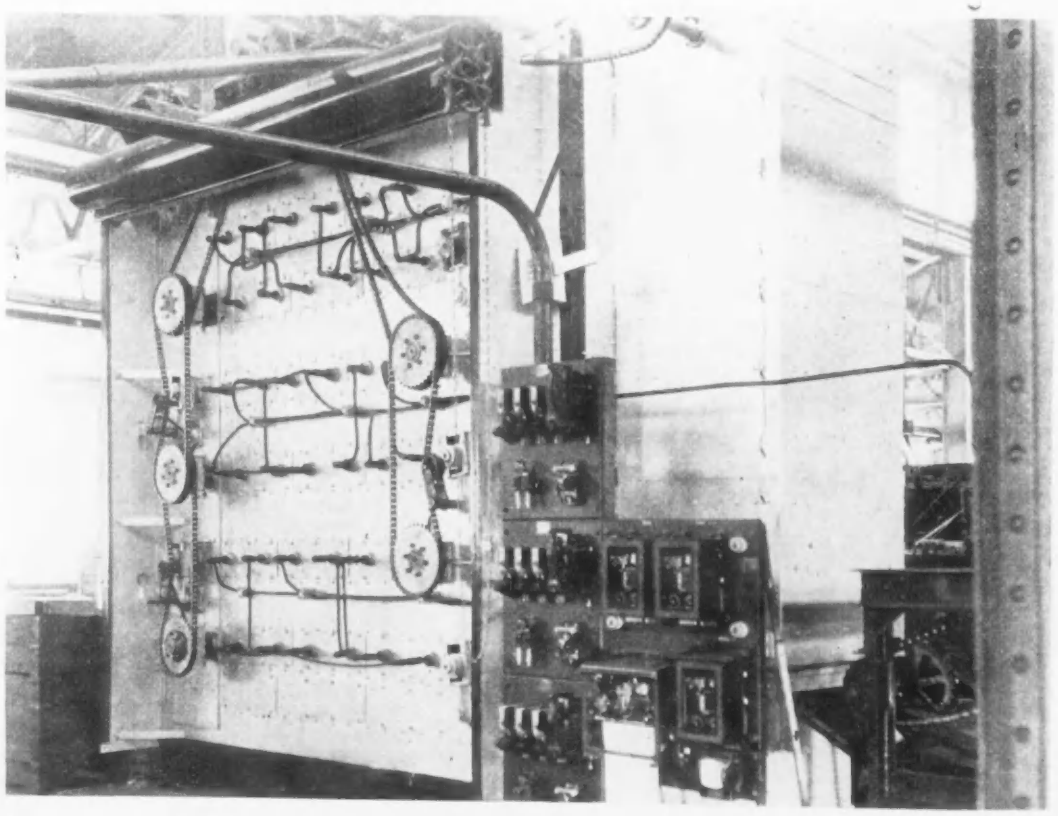
Forge Shop Inspection

Upon receipt of steel at the forge shops, a minimum of 10 per cent of the "tops" and "bottoms" of the ingot product is macroetched, drilled for chemistry **at center** of bar, billet or bloom. Failure to fall within a plus or minus tolerance of less than half the S.A.E. chemistry limits may mean outright rejection, or final disposition through further physical tests.

All new forgings of our four highest classes—gears, pinions, roller rims and track links—are sectioned and etch-inspected for flow lines, before approval is given for making a run. (See illustration.)

All forgings from a certain mill heat are identified in code. Letter code is used to avoid mistaking with part number in service.

All forgings of the classes mentioned are made



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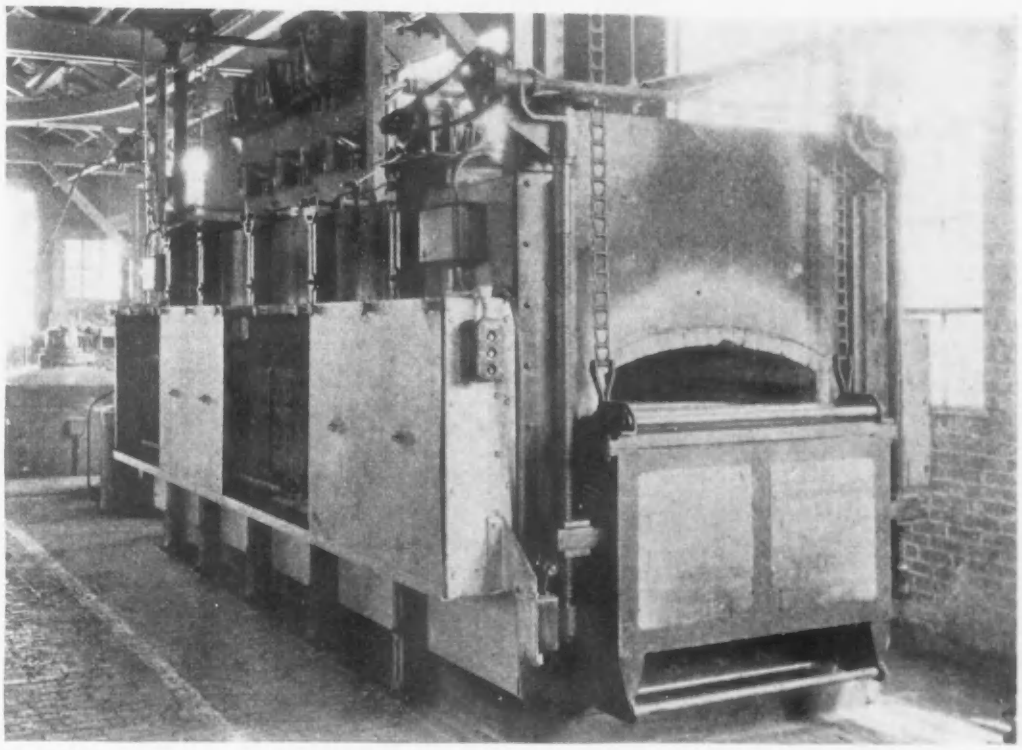
Three-zone multiple-conveyor track-link draw furnace, showing separate controllers for each zone; also three-point recorder.

▼ ▼ ▼



Two-stage roller hearth furnace, showing three-zone controllers, pre-heating, heating and holding.

under temperature control. They are also pickled for final inspection before leaving the forge shop.

Heat Treatment Furnaces of Company's Design

All heat treatments, except of some special or finished parts, are conducted in the company's plants, and for the most part, in furnaces of our own design.

These furnaces are constructed primarily for developing by precise control the maximum physical characteristics of which the steel is capable. Thus, furnaces of many zones or regulated input, to avoid too rapid heating or over-heating, uniform saturation at temperature and close temperature control, have been fundamental in our designs.

All ideals and purposes have been shaped toward obtaining the best possible inherent steel quality initially, and so treating the steel that its final characteristics are the result of its maximum physical enhancement.

The Formation of Graphite in Cast Iron

CERTAIN recent work seems to support the view of Heyn that graphite in cast iron is not a primary product of crystallization, but is formed by the secondary decomposition of cementite or the cementite eutectic ledeburite. However, H. Hanemann (*Stahl und Eisen*, July 30, 1931) reports work which indicates the direct precipitation of graphite from the melt. Tests were made on the alloy 4.15 per cent carbon, 0.09 silicon, 0.18 manganese, 0.024 phosporus, and 0.019 sulphur, which is near the eutectic composition, and which has a silicon content favoring the formation of white cast iron. On cooling a 15-gram melt at 3.6 deg. per min., a 52-sec. halt was observed at the eutectic point (2086 deg. F.). Samples quenched from above the eutectic temperature showed a pure ledeburite structure, and the halt point quench produced intermingled graphitic and ledeburitic structures, the fraction of gray structure increasing with the time of arrest. Directly below the eutectic temperature, quenching gave completely gray structure, showing graphite was formed during solidification of the melt.

That graphite can not in this case be the result of secondary decomposition of ledeburite in a very rapid reaction is shown by times required for graphitization indicated in the table. Small melts were cast on an iron plate so as to hinder the development of graphite nuclei, charged hot into constant temperature furnaces, and exposed for increasing periods of time before quenching and observing the extent of graphitization.

Temperature, Deg. F.	Time (Hours) for Complete Graphitization
1832	6.0
1922	4.0
2012	2.2
2039	1.7
2084	1.0

The fact that about an hour is required to decompose the ledeburite at the eutectic temperature while only 52 sec. elapsed at the arrest indicates the formation of graphite directly from the melt. Metallographic examination of the specimens resulting from melts quenched at the eutectic temperature confirms the view that graphite is the product of primary crystallization.

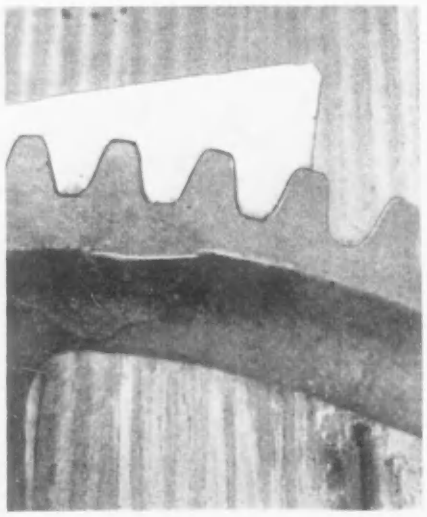
EMERGENCY ELECTRIC WELDING SAVES SHUTDOWNS

IN the first installment of this article, published Nov. 19, details were given on emergency maintenance jobs done on a number of pieces of equipment of varying descriptions. The story is carried forward in this, the concluding installment, showing how such work was prosecuted on press, steam engines, gear wheels, etc. Each case represents a doctor's call to get the patient back at his work at the earliest possible time. Production was needed, and the delay for new equipment would have been disastrous. All of this is the work of the Mattice Engineering Co., Philadelphia.

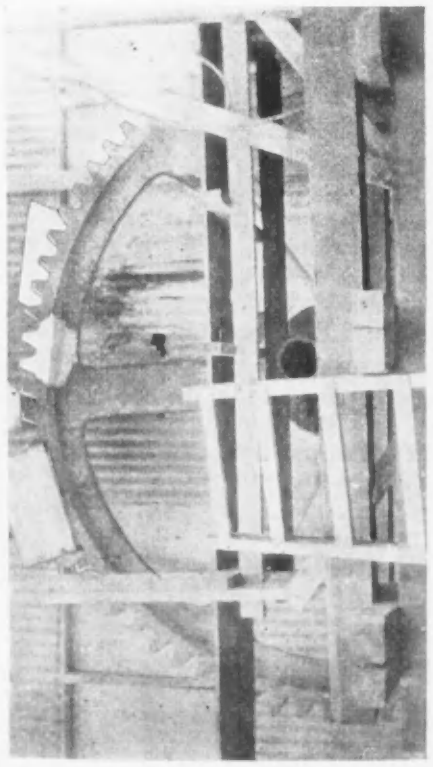
ONE thing which has been found essential if a satisfactory job is to be rendered is the use of a high-tension welding wire. Any electric welding job has a strength based upon the strength of the wire with which the job is done. If that wire is of the ordinary run of mine, 55,000 lb. tensile strength, it is likely to have only 45,000 lb. of strength in the completed job. This is because the welding operation itself burns out about 10 points of carbon from the wire and reduces the strength about 1000 lb. for each point. It follows that a job on cast steel of 70,000 lb. tensile strength will be weakest at the weld, if the ordinary welding wire is used.

To overcome this deficiency a special electric steel wire for this purpose, having a tensile strength of 92,000 lb., is employed. Based on the same loss of carbon and corresponding loss of strength, the weld metal should have remaining in it after welding a strength of more than 80,000 lb. This is decidedly on the safe side, and the margin is regarded as offsetting any likely weakness through failure of the human element to avoid all blowholes in making the weld—a feature just as likely to occur with the 55,000-lb. welding wire as with the 92,000-lb. welding wire.

Another problem with which this service has had to contend has been the question of coating the wire. For practically all purposes welding wire requires a coating of some sort. The character of the coating, however, varies distinctly with the kind of material to be welded. Sometimes also it is necessary to put a special surface on the portion which has been welded, so that it may withstand acid action or other



SHOWING matching of plaster template with new teeth made by aid of the template, after they had been welded into place on a gear wheel 16-ft. in diameter by 14-in. face. This was done at the plant of Lehigh Portland Cement Co. (at left).



Another view (at right) of Lehigh gear wheel, indicating how the work was done on the site. The template is shown engaging with good teeth, and the new teeth alongside.

contaminating or destroying influences in the equipment itself.

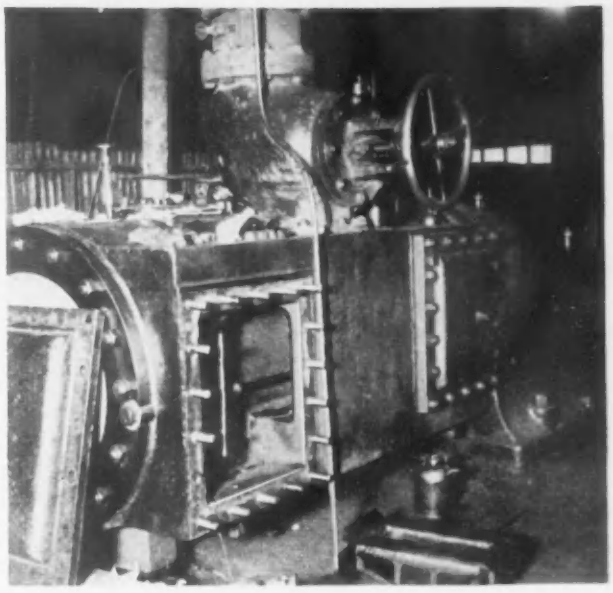
An example in point is the use of a copper-loaded wire, whereby a surface extremely rich in copper is placed over a welding job, merely as a protective surface, having little to do with the strength of the job but a great deal to do with its resistance to future corrosion of a particularly virulent nature.

Working Inside a Pump or Engine

FREQUENTLY a repair is called for on a piece of equipment too massive to be removed, and often almost inaccessible. This latter happens in pumps, where sometimes the valve seats have to be repaired, and in steam engines, where again the trouble is as likely as not to be in the interior of the cylinder. All such cases call for the use of practical experience acquired in other previous cases, whereby various expedients have been developed to take care of particularly knotty problems.

Such a case came up some time ago in the plant of Henry Disston & Sons, Philadelphia. An interior break occurred in the cylinder of a 750-hp. Porter-Allen engine of which the manufacturer had destroyed the patterns. Making new patterns and casting a new cylinder would have been an expensive and long-drawn-out job. Five months was quoted by the original maker of the engine.

This was one of those cases which had to be handled on the interior. Templates were made and steel plates cut to fit in place of the broken part. The welding job was then performed, closing up the

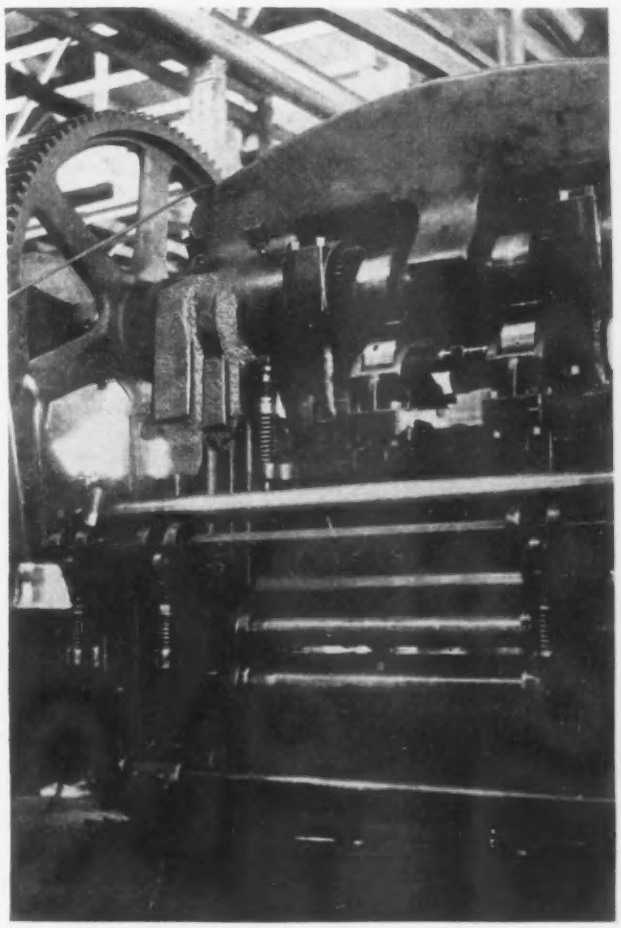


Engine cylinder opened up for repair, plant of Henry Disston & Sons

crack which had developed and the engine was running again on the sixth day. After several years' operation of this engine since the repair, the owner reports that it is still running satisfactorily.

Building Up Worn or Broken Gear Teeth

ANOTHER form of maintenance which frequently has to be done lies in replacing broken teeth on large gears. One such case had to do with a gear



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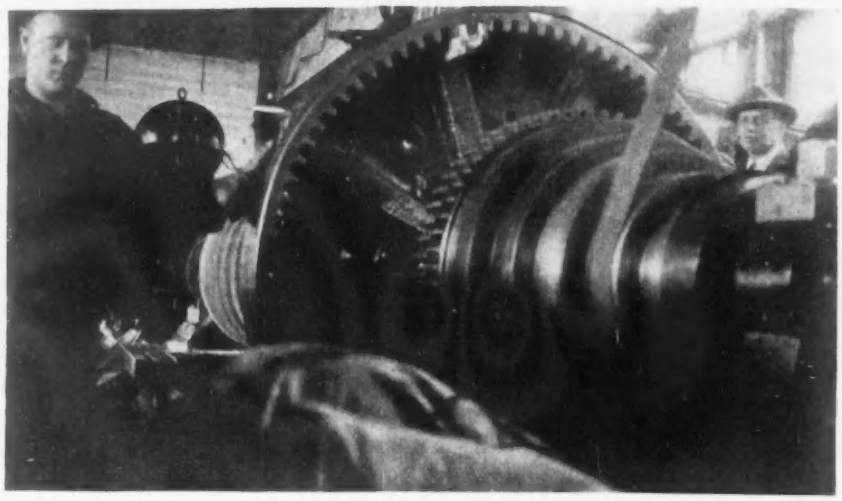
Press frame at plant of Loubenstein Mfg. Co., showing plates welded on over a break. Perfect alinement had to be maintained.

Detail of a portion of the repair work on the Disston engine.

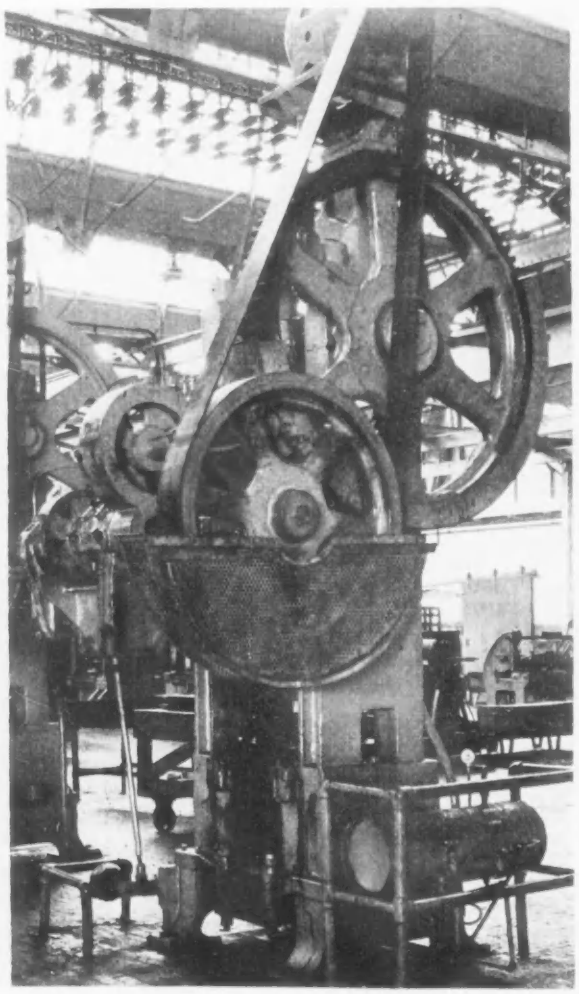
SEVEN new teeth for this internal gear, in plant of American Bridge Co., were cast, dressed and welded into place.

Repairs to gear wheel on press in Atwater Kent plant show in lower view. This was described last week.



wheel 26 ft. in diameter in one piece. This was too large to be shipped out for repair and, as in many other cases, the doctoring had to be done on the job. A plaster of paris cast was made from a group of several gear teeth, which were in good condition, on the same wheel. This was then used as a basis for a steel casting of a section of three or four teeth. Then the defective teeth were cut away and the new section welded in, with such allowance for shrinkage that it left the complete job with the same spacing of teeth and the same smooth outside periphery as the rest of the wheel.

A job on a large cast iron drive wheel, employed in rope drive of a manufacturing unit, consisted in repairing two of the arms which had been broken. It was found that getting a new wheel would have meant a shutdown of ten weeks. The repair job was done in the same manner as that described above for the rotor of an electric motor, and the machine was back in the production line in five days. This not only saved a good deal of the direct expense, but the undeterminable and large cost that would have followed a loss in production for a two-month or longer period was avoided.



Bankers Must Encourage Customers

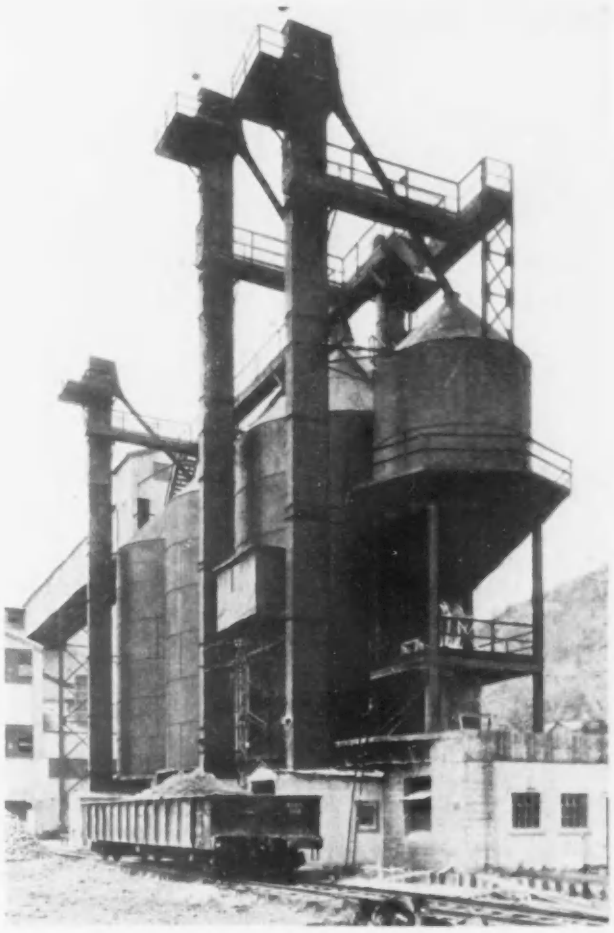
NOW that we have a five hundred million dollar revolving fund, in the hands of the National Credit Corporation, which can be used when and as necessary to strengthen the credit of individual banks throughout the country, the danger of unexpected and unwarranted withdrawals of deposits and accounts has been minimized.

With this load removed from his shoulders, the banker can now afford to loosen up a bit with regard to extending credit to industry and business. "Bankers must broaden their view," says the President's Organization on Unemployment Relief. "They must assume as liberal and encouraging an attitude as possible toward the credit requirements of the average customer."—American Publishers Conference.

TUNGSTEN carbide dies do not lose their hardness at relatively high temperatures, and so C. R. Longwell, engineer, Carboloy Co., Detroit, believes that hot drawing may well be practiced, with resultant great reductions in the cost of drawing. The suggestion is for hot drawing considerably below the size of the wire rod and then cold drawing to secure the physical characteristics finally desired.

Obtaining Maximum Service from a Bucket Elevator

By RALPH McMILLAN
Construction Superintendent,
Link-Belt Co., Chicago



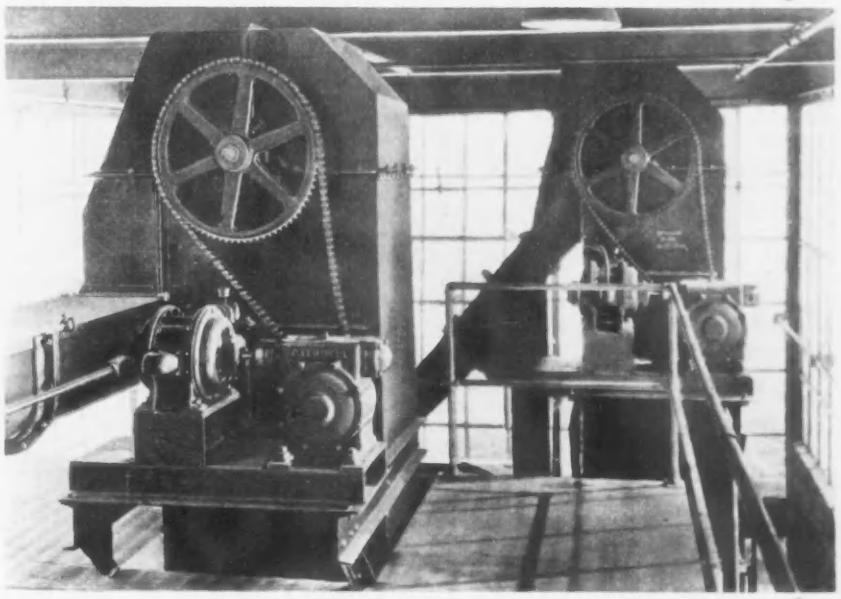
Bucket elevator handling lime from railroad cars to storage bins in a plant near Pittsburgh.

THINKING back over more than 15 years of experience in the selection, erection, maintenance and servicing of various types of bucket elevators, I say seven points should be watched.

Avoid Overloading. In originally selecting a bucket elevator for a given purpose, the specifications of the material to be handled and the quantity to be elevated during a given time, with regard to the greatest load at any one interval, should be known. From this, an elevator designed to give the longest efficient service will be obtained. If the plant's capacity is expected to increase in the future, this fact should be borne in mind and the original elevator provided to care for this anticipated capacity.

Roominess. Sufficient room in the elevator casing is essential to long life, as ample space does away with the wear of buckets on the casing, and its resultant depreciation. Pits for the elevators should always be roomy, to allow quick and easy access for adjustments, cleaning of the boot and lubrication.

Uniform Feed. On centrifugal-discharge type elevators the receiving point should be well up above the foot shaft, so that the major portion of the material is discharged directly into the buckets. A uniform feed is essential, because the elevator will choke and stop if overloaded. This applies to continuous bucket elevators as well.



Caldwell elevator drives, on bucket elevators in a Chicago plant, eliminate much of the noise often present.

Proper Discharge. Make sure the discharge chute is of ample proportions, and placed at a suitable slant or angle, to insure immediate freeing of material, without danger of its backing up to the ling of buckets.

Driving Mechanism. A positive drive gives best results. This may be accomplished through the use of several efficient methods. The drives illustrated show a variety of these compact efficient drives. The use of these drives eliminates much of the usual noise and vibration, as well as annoyance, of the elevator drive.

Lubrication. Best methods are through pressure systems, and the use of take-ups, pillow blocks, etc., having ample grease or oil storage facilities. Drives running in oil- or dust-tight casings give longest service.

Danger. When material is heard dropping down the elevator casing, it is time to stop the elevator and investigate, as something must be wrong. If the man in charge does not know what to do, any bucket elevator manufacturer's engineer or service man can tell him.

REFRACTORIES, MOLDS POURING DISCUSSED

REGISTRATIONS at the fourteenth semi-annual meeting of the Open-Hearth Committee of the American Institute of Mining and Metallurgical Engineers was 117, which compares with a total last spring, in Chicago, of 169. The meeting this fall was held in the Book-Cadillac Hotel, Detroit, on Nov. 24-25.

Somewhat more of an international character than usual was imparted to the meeting through the presence of Mr. Hoskins, superintendent, and Mr. Merritt, chief engineer, from the Australian Steel Corpn., Sydney, in addition to the usual group of about a dozen members from Canada.

As has been the case for some time, there were no set papers, but a number of reports were read by chairmen of several committees, dealing with specific open-hearth problems.

Opening the meeting, the chairman of the conference, Leo F. Reinartz, works manager, American Rolling Mill Co., Middletown, Ohio, expressed gratification at the considerable attendance in spite of the business situation. Major depressions such as the present, he said, force economies all along the line. Costs have to be reduced, and this goes from the open-hearth department back through the raw materials to the blast furnaces and the sources of supply of scrap.

Despite the increasing readiness of the operating men attending these meetings to discuss frankly the matters which come up in the way of intimate shop practice, Mr. Reinartz made a plea for still greater cooperation through volunteering information whenever possible.

A brief general report on finances was made by Clyde E. Williams, assistant director, Battelle Memorial Institute, Columbus, Ohio. Contrary to general experience this year, Mr. Williams reported an increasing balance in the treasury after paying all expenses. This balance is now between $500 and $600, compared with about $150 last year.

Can Cheaper Refractories Be Used?

WHETHER a second-grade checker brick can be used satisfactorily came in for considerable discussion. Several speakers reported a steady practice of buying the best brick possible, and one man said, "The best is none too good." Contrasted with this opinion was that of several others, who reported using a lower grade of brick in the lower portion of the regenerators, with considerable success. One man stated that he uses the second-grade brick for the top layers, inasmuch as these have to be taken out and thrown away anyhow, after a run.

Low-grade firebrick was reported to vitrify on the surface, with the result that it will not properly absorb heat from the outgoing gases, and hence reduces the efficiency of heat transfer. At top of checkers, where the temperature is highest, these lower-grade brick get stuck together and melt down faster than the first quality. It appeared that the plants in which these brick are being successfully used are those in which the regenerators do not get excessively hot.

One man said that the matter of draft and combustion control is a guiding consideration in this respect. A draft of 1 in. of water would be enough to burn these brick all down, whereas half that amount could be used with entire safety.

A refractory man reported his observation that the present tendency is to get away from second-grade refractories to a higher quality. This makes the furnaces work more sharply and more efficiently in the later stages of a run, and results in less clogging of the passages. He reported much confusion among operators as to what constitutes second-quality brick. Some of them will fuse at 2900 deg. F., while others of the same designation, but in reality a third quality, will fuse at as low as 2500 deg.

Regarding the type of brick most suitable for facing bulkheads and ports of furnaces, several men reported a preference for silica brick, particularly for the bulkheads. Others use a metal-cased brick and get 300 to 400 heats from them, with natural gas as a fuel. This compares with 60 to 100 heats reported on some of the silica brick bulkheads.

One operator reported using a 9-in. silica brick wall for the bulkhead, so located that a further 9-in. space is available outside this wall. When the wall wears thin enough to suggest repair, he builds up an outside 9-in. wall right against the worn wall, and gets a life of from 200 to 250 heats from it.

High-alumina refractories are used to considerable extent in lining open-hearth ports, and also for the top courses of regenerators. These brick run as high as 76 per cent alumina and are reported to be giving good service.

Making and Insulating Bottoms

Insulated bottoms on rebuilt furnaces were reported from several sources. One operator has put 2½ in. of insulating material on the steel pan, and then built the brick and magnesite bottom on top. Another man put in 4 in. of Sil-o-cel concrete. On top of this was 6 in. of magnesite mixed with Portland cement; then the regular 12-in. bottom was worked in, and better results are reported than from the customary practice with fire clay brick. There is less loss of heat through the bottom of the furnace and less bottom trouble. One of these installations was made in 1928 and a second in 1929.

Still another case was reported, this time from Australia, in which the bottom is made of a pure white Australian magnesite mixed with about 10 per cent of open-hearth slag. On top of this a single layer of clay brick, surmounted by three layers of magnesite brick, forms the foundation for the regular bottom of sintered magnesite. Another man reported putting in what he considers a very inexpensive bottom, consisting of 30,000 lb. of chrome ore, with two courses of clay brick and three of chrome brick.

One man from Canada had occasion to put in several bottoms in 1926; in some of these he used Austrian magnesite with 15 to 18 per cent of slag. In others he used magnesite without any slag, and reported these to operate better. He made use of a quick-setting magnesite, the main advantage of which was reported to be a saving of time on the furnace—42 hr., in one case.

Disintegration of bottoms during a

AND STEEL

AT OPEN-HEARTH MEETING

prolonged period of shutdown such as the present came in for considerable attention. One man reported swabbing the bottoms of furnaces with pitch and said that they look good, even after 18 months of idleness. Furnaces which have been started up after this treatment are given a wash heat, washing out 4 to 5 in., and then built up to original condition.

Another man puts 4 in. of coke braize on the bottom and reports no slaking after about a year. In another case, where six furnaces have been down for some months and the location is subject to bad river fogs, no trouble is reported, although nothing was done to these bottoms.

Increasing the Capacity

Methods to increase the capacity of furnaces were discussed briefly. One report showed a decrease in the depth of bottom material through omitting some of the clay brick or some of the magnesite brick or both. In one such case insulation was put in to replace a part of the brick omitted.

It was reported that 3 in. of C3 cement has the same thermal conductivity as 10 in. of clay brick. Several furnaces were reported upon as to conductivity, somewhat in accordance with Table I.

Another operator expressed the view that it is a mistake to cut down the bottom when seeking extra capacity. He advocated raising the sills, ports and roof. This, he said, will give three or four times as much gain in capacity for each inch of change as can be obtained through deepening the bottom, because of the much greater surface at the top of the bath compared with that at the bottom. It was brought out that in one case both these expedients were employed, because of the very great change in a furnace from a capacity of 65 tons to 125 tons.

Table I.—Conductivity of Furnace Bottoms

Make-up of Bottom	Conductivity
A—11 in. fireclay brick; 6 in. chrome	0.401
B—2 in. C3 cement; otherwise as A	0.290
C—15 in. fireclay brick; 12 in. chrome	0.347
D—2½ in. C3; 12½ in. fireclay brick; 12 in. chrome	0.266
E—20 in. fireclay brick; 12 in. chrome	0.287
F—60 in. fireclay brick; 12 in. magnesite	0.118

All had fused magnesite over the brick; in C, D and E this was 12 in.; in F, an old furnace, 13 in.

More Attention to Pouring Conditions

GRADUAL changes in a number of important items in pit practice have been coming about, even with the use of the same equipment. The matter is being complicated by the increasing size of heats. More attention has to be paid to nozzles and stopper heads as one goes from 40-ton heats to 60 tons, and then to 100 tons and 150 tons. In each case one stopper rod and one head are used, but the conditions of use are quite different.

Ladles are being made as shallow as seems feasible, in efforts to avoid the splash of steel from too great a ferrostatic head. To this end some ladles are made elliptical in plan, in obtaining greater capacity with the same bails on the ladle crane. Another feature is an extension of the use of two nozzles to the ladle, whereby the heats may be poured more rapidly.

In some plants nozzles are 12 in. or more in length; in a few instances the sections are other than round, again to avoid splash. Stopper rods should be dried for 48 to 72 hr. before being used, and it is advisable to hang them in a vertical position while drying, instead of the customary horizontal.

Hot-tops are coming more and more into use. In instances where these are lined with brick, they are reported to be good for two or three ingots.

One man told of using a pouring box in handling 35-ton heats in making steel castings. Two reasons were given for this. The principal one is that the time of pouring the castings is materially reduced from the 1¼ hr. formerly required. Secondarily, this arrangement disposes effectually of the matter of a troublesome ferrostatic head.

Using a 2-in. nozzle, 9½ in. long, for teeming the steel into this box, a life of six heats was reported for the nozzle. The box is about 4 ft. long and 6 or 7 in. deep; there is no more wash of refractories from the box than without it. It is lined with the hardest ladle brick obtainable, and relined completely as fast as it wears out. The steel is much hotter than that customarily poured into ingots, and it is poured through two nozzles in the bottom of the box.

This same method was reported to have been used during the World War in making forging ingots. It was claimed to give better results than a direct pour from the ladle.

Mold Coatings

A STRONG case for the use of graphite for coating molds was made by one man, who discussed generally the topic of mold coating. A natural carbon, mined like coal, graphite comes usually in two forms: —crystalline or flake and amorphous or non-structural. As the natural material was formed under conditions of enormous temperature and pressure, it has the property of resisting great temperatures and pressures.

A saving on the finished product of as much as 60c. a ton was reported from dipping molds in a mixture of graphite and water. As graphite is insoluble in water, the mixture must be kept thoroughly agitated if a uniform coating is to be obtained. Ingots cast in such molds strip easily and are subject to a lower chipping cost.

Best results are reported from amorphous graphite, finely ground and of uniform purity. This will adhere easily to the mold surface; it lubricates that surface and thus prevents splashes of metal from sticking and forming scabs. As the best grade costs only slightly more than cheaper grades, and gives far better service, its use is recommended.

Graphite is mixed with enough water to make a paste and then worked over thoroughly to get rid of lumps. This paste is then diluted to proper consistency at time of application. There must be a positive coat-

ing of graphite on the metal surfaces, and a ratio of three parts of water to one of graphite was recommended. The mold should be warm—say 125 deg. F. This point was disputed by another man, who said that the mold should be at least 300 deg. F., well above the boiling point of water, but not so high as to make the water spit and dislodge the graphite.

Three main methods of coating a mold are spraying, dipping and swabbing. Spraying was reported more economical than dipping, and equally effective. Swabbing was not recommended. Spraying, which was given first choice, would be from a mixture kept in a spray tank and thoroughly agitated.

If a dip tank is used it must have facilities for air agitation. It must also have a false bottom, so that dirt and other foreign matter may be removed at intervals.

One man reported thoroughly satisfactory practice through dipping the molds in tar, while at a temperature of 450 deg. These molds come out with the surface looking like patent leather. They are thoroughly coated all over, whereas spraying, being subject to the human element, would be more variable and, this man believes, definitely poorer. He stated that cracked ingots, which are sometimes reported to follow the use of tar, are due either to an incorrect mold design or a poor steel or both.

Aluminum paint is used as a mold wash in a plate mill on all killed steel, and the operator reported liking it very much. This plant practices bottom pouring. With two or more molds on a single runner, there is a bad surge of steel in the nearest mold, running up 2 ft. or more and tending to wear off the coating.

A mold manufacturer reported observations of practice in a large number of plants. He has concluded that graphite is the best material to use and that spraying is the best method of applying it. An outfit for spraying costs about $75. A mixture of one part of graphite to five parts of water by volume was reported satisfactory. A mold can be thus coated in about 30 sec. and it is very important to have it at the proper temperature. This man believes that plunging a warm mold into a much cooler solution has a tendency to shock it.

Molds Must Fit Their Work

Another mold maker thinks that the mold is about one-twentieth of the problem between the blast furnace and the shipping dock for the finished steel. After the ingot has been properly designed for the product to be made, the mold should be designed for the lowest overall mold cost. Each mold must be properly proportioned for its own particular work.

While the corner radius is a practical consideration in the steel plant, the wall thickness is more important to the life of the mold than it is to the quality of the ingot. The higher the quality of ingot being made, the shorter should be the mold.

Cross-sections are dictated by the product. Among the various cross-sections, the round molds have the longest life. Next come the fluted sections, then the square, the near-square and the slab, with the extreme slab, so to speak, in worst position.

Tar dip permits the use of a shorter corner radius. There is another consideration, however. High-carbon steel with sharp corners is susceptible to severe injury in the soaking pits, as the corner is likely to burn. One man expressed the opinion that this question of corner radius is largely up to the rolling mill department. Small corner radii, if associated with an obtuse corner angle such as 120 deg., are said to be satisfactory, although at 90 deg. the ingot would be burned.

Whether an ingot should be cast with big end up or big end down was discussed at some length by Emil Gathmann, Baltimore, who favors the big end up. Referring to the sketch, Mr. Gathmann pointed out that, as the ingot contracts in solidifying, the ingot poured in mold *A* releases much more rapidly its direct contact with the mold wall than in *B*. This results sometimes in a breakout through a weak skin, and in any case causes a film of air to interpose itself between the two metal surfaces. Ingot *A* is easier to handle and to strip, but *B* gives a better service condition. Not yet, however, have we reached perfection in this matter.

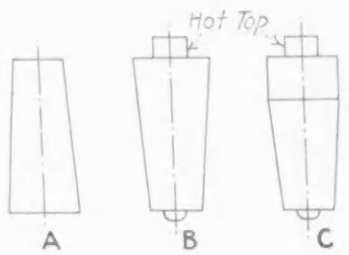
An air film between ingot and mold is bothersome. It interrupts the cooling cycle and extends the time of cooling of the ingot. Mr. Gathmann said he is experimenting in lifting the ingot in *B*, and getting a definite air current between ingot and mold, to study the effect.

In the case of ingot *B* the hot-top takes all of the pipe. Because of the button on the lower end, the loss from crop at this end of the ingot, when rolled into a bloom, is only about 1 per cent, whereas the customary fish-tailing in the square-bottomed ingot entails a loss of about 4 per cent. He reported that John A. Roebling's Sons Co. has been making rimming steel in this manner for about two years.

One difficulty sometimes encountered in ingot *B* consists in horizontal cracks near the top, occasioned by the ingot hanging there, inasmuch as the smaller, lower end solidifies first. To overcome this the upper part is being made practically straight, as in *C*, and this leaves no tendency to bind there.

Just enough taper is required so that the ingot will strip readily. This results in giving the big end an area 14 or 15 per cent greater than the other end. The ingot length should be about three times the average diameter, and never exceed 3¼ times.

(To be continued)



Big-end-down ingot. A, is easier to strip, but B is said to give sounder steel and C to avoid one source of surface cracks experienced with B.

Develops New Alloy for Dairy Products

A new non-ferrous alloy, said to combine strength and resistance to corrosion and tarnish with a facility of manufacture that makes it readily workable in all commercial forms, is announced by the development and research department of the International Nickel Co. It was developed especially for dairy machinery and was displayed for the first time at the Dairy Show in Atlantic City.

This new "Inco chrome-nickel" is a nickel base alloy low in iron and containing chromium. Tested under actual operating conditions, it is said to have shown high resistance to the tarnish of dairy products, brines and cleansing agents. It is being produced in the form of sheets, bars, tubes and castings.

Production of the new alloy marks the completion of a long series of laboratory tests upon it and a wide range of other corrosion and tarnish resisting materials to determine the most satisfactory combination of these qualities with working properties and strength.

As an example of the results obtained from these tests, it was determined that under constant exposure in the high acid conditions of a buttermilk machine, 16-gage sheets of this new product would lose less than half their thickness in 300 years.

In addition to these tests, full scale equipment was manufactured in several plants which involved the use of various forming methods and many types of seams. Fabricating methods used were suitable for sheets and plates from 24 gage to ¼ in. thickness in any common shape. Seam types included electric and oxy-acetylene welding, brazing, and soldering. Units, such as a large positive holder, a vat pasteurizer for buttermilk and a light gage spray pasteurizer, were manufactured and put into actual service in dairy plants. These units have now been operated for a sufficient length of time to prove their practical success, says the company.

Announcement of this alloy represents a new step by the International Nickel Co., which has for some years limited its materials in the dairy field to pure nickel and Monel metal.

Machines for Cleaning the Flash from Resistance Welds

By M. L. ECKMAN
Research Engineer, Federal Machine & Welder Co., Warren, Ohio

THE "flash" or surplus metal left along the weld made by the resistance welding process consists of a rough ridge of metal and slag varying in width and height according to the cross section of metal being welded. The composition of the material also affects the size and amount of flash, low-carbon steel producing the most flash and high-speed steel, and particularly nickel-steel alloys, producing the least flash.

In the early days of resistance welding the flash was not considered so undesirable, as then welding was regarded as a blacksmith process. With the development and wide use of the process for assembling finished and semi-finished parts of all kinds, the removal of this flash became a problem calling for considerable thought. This is particularly true of welding sheet metal ranging from No. 20 gage, 0.0375 in., up to No. 16 gage, 0.0625 in.—the sizes generally used for automobile body work, electric refrigerators, tanks, drums, barrels, containers, stoves and other widely used resistance welded sheet steel articles.

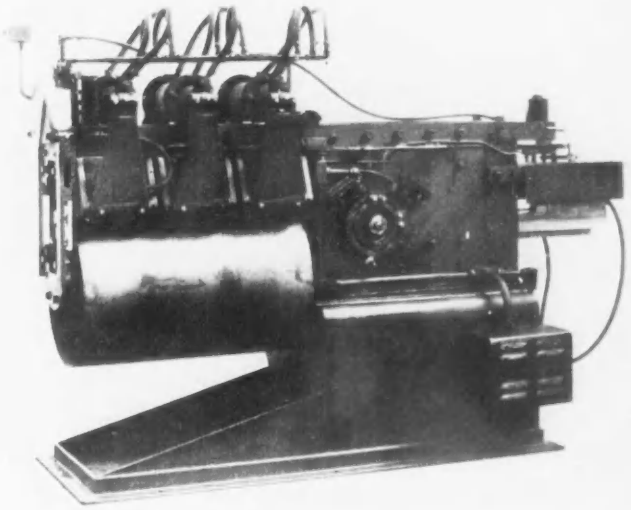
At first the welding flash was removed by a light air chipping hammer and worked down flush with the parent metal by an emery disk mounted on a flexible shaft. Later, light weight motors hung on springs from the ceiling were used. These methods are still employed on irregular contours, such as rear quarter panels of closed automobile bodies, the weld being so neatly finished that it cannot be detected in the finished bodies.

Fig. 1 shows a pioneer development in a machine for this work—the first flash stripper brought out by the Federal Machine & Welder Co. Such a machine must be both rugged in construction and rapid in operation. The one shown consists of a sturdy welded structural steel housing supporting a frame through which a double ram reciprocates. After the work, in this case a steel barrel, has been slid into position over the ram frame, the latch arms are swung down, securely locking the outer ends of the bifurcated ram frame together and acting as a safety guard for the operator. Hand-operated air valves control the three 5-in. clamping cylinders which secure the drum rigidly ⅜ in. from the weld at each side. Push-button control is provided for the motor, which moves the bifurcated ram outward across the barrel to the end. Two roughing cutters remove most of the metal as the ram travels. The machine then reverses automatically, the ram returning to the starting position with the finishing tools cutting on the return stroke. The roughing and finishing tools, designed on the clapper box principle, allow only the roughing tools to cut on the outward stroke and the finishing tools on the return stroke.

Standard tool holders and bits made by the O. K. Tool Co., Shelton, Conn., are used. Cutters can be adjusted to any length up to a maximum stroke, and provision is made for adjustment to compensate for the grinding of tools. The clamping device is interlocked with the motor to eliminate the possibility of operating the machine before the work is properly clamped. Cutting speed of 60 ft. per min. and production of 120 drums an hour are obtainable.

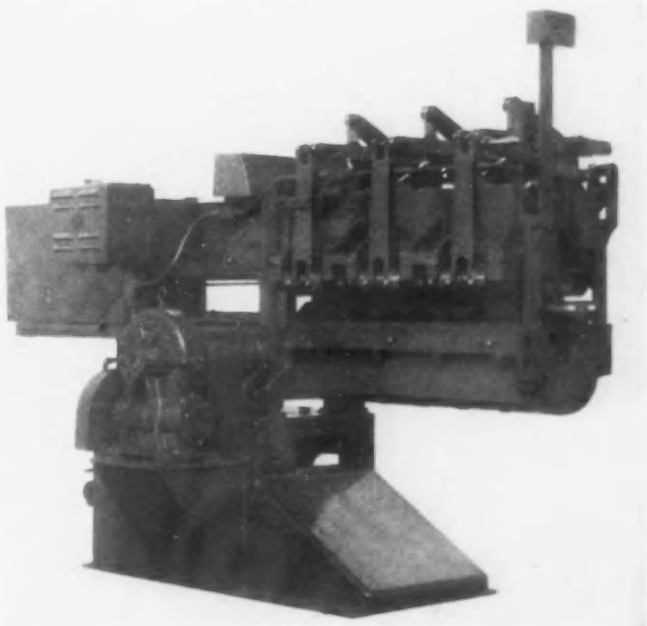
A heavier type of flash stripping machine, Fig. 2, that operates on the same principle is also built; it is intended for use on welded tanks, ice cans and similar products.

A special hydraulically-actuated flash stripper designed to give 275 to



ABOVE

FIG. 1.—A double ram carrying roughing and finishing tools reciprocates along the weld, quickly removing the flash. Air cylinders clamp the welded barrel ⅜ in. from the weld at each side. Standard toolholders and bits are used, and the clapper box principle is employed so that only the roughing tools cut on the forward stroke and the finishing tools on the return stroke. Cutting is at the rate of 60 ft. per min.



AT RIGHT

FIG. 2.—This flash stripper is of heavier construction than that shown in Fig. 1, but operates on the same principle. It is used on welded tanks, ice cans and similar products.

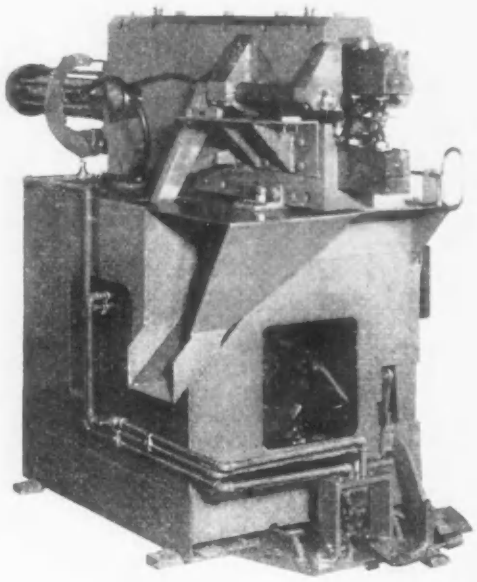


FIG. 3.—Hydraulically-actuated flash stripper designed to complete from 275 to 300 cycles an hour. One depression of the foot lever clamps the work, causes the ram to start forward, reverse automatically and return to its starting point, and releases the work in preparation for the next cycle.

FIG. 4.—Automobile radiator shell as formerly made.

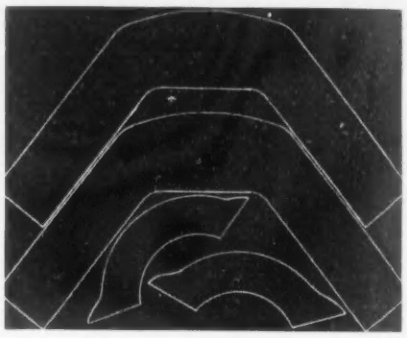


FIG. 5.—Two shells are now obtained from one sheet, the parts being subsequently welded and flash stripped. (Lower right).

300 operations an hour is shown in Fig. 3. Smooth and powerful operation and flexibility as to speeds are features of this unit, which has a two-way cylinder that operates the ram in either direction through an ingenious hydraulic control valve. There is a suitable hydraulic reservoir and a pump that is driven by a 5-hp. motor. One depression of the foot lever clamps the work, starts the ram forward, reverses it automatically, returns it to the starting position, and releases the work in preparation for the next cycle. The machine may be stopped at any point of the stroke by means of hand control. A dirt chute carries the waste material to a box at the side.

Use of welding and flash stripping in the manufacture of radiator shells furnishes one of several examples of savings obtained by these processes. Fig. 4 shows the radiator shell as formerly made; one shell was obtained from a sheet, the center part and corners of which had to be utilized for other purposes but represented waste so far as the radiator manufacturer was concerned. Fig. 5 shows the present design and practice; two shells are blanked from one sheet, the parts being subsequently resistance welded and the flash stripped.

New Microscope Speeds Examination of Metals

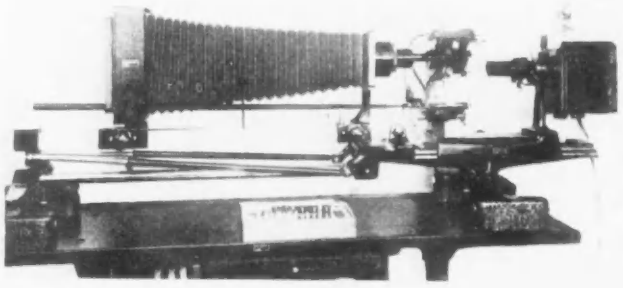
THE Cadillac Motor Car Co., Detroit, has installed in its metallurgical laboratory a metallographic microscope capable of measuring the crystal structure of metals to within a hundred thousandth of an inch and of taking a picture of a specimen magnified 15,000 times. Using this new instrument, a microscopist can complete in 30 sec. a test formerly requiring 20 min.

Invented by L. A. Danse, Cadillac's chief metallurgist, the microscope is the only one of its kind in existence. It can be completely taken apart and reassembled in 1 min., whereas four to five hours is needed to perform the same task with other types. Its outstanding feature is the fact that it can be adjusted instantly to its original position following a test. It is supported by steel springs and sponge rubber so as to absorb the vibration in the factory. The design is heavy and stiff, so that, owing to its rigidity, weight and manner of support, it can be used even for high magnification when the factory is running full.

Describing the microscope, Mr. Danse said:

"Heretofore we metallurgists have given much thought to accuracy, but have almost neglected speed. High-speed processes of manufacturing having been introduced into nearly all departments of automobile factories, I decided it was time that our department kept pace. High-speed work is assured by the microscope because the adjustments for the whole optical system are so graduated that the manipulation of the specimen will be much easier and faster. By the mere touch of a button, one can change the path of light rays from the binocular eye piece to either a horizontal or vertical camera.

"I developed some of the features from the basic ideas to be found in the equipment of a battleship. By adopting some of the principles of the range finder and of the bubble extant of a ship, I developed a new design of a filar micrometer which measures the size of crystals in a metal and which makes possible direct reading instead of computation. As an illustration, when one looks at his speedometer he knows instantly how many miles he is traveling. By attaching the new filar micrometer to the microscope, the operator can read immediately the crystal measurements of a metal to 0.00001 in." The microscope was built by the Bausch & Lomb Optical Co., Rochester, N. Y.



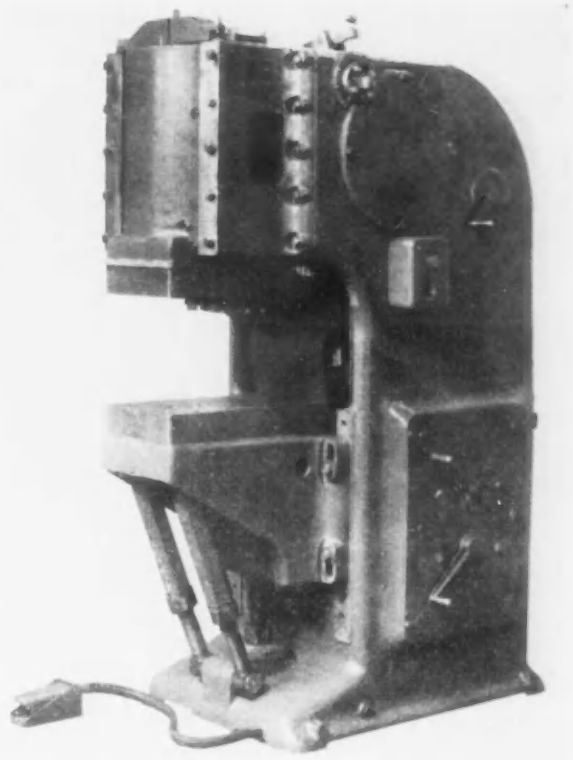
NEW microscope developed by L. A. Danse, chief metallurgist, Cadillac Motor Car Co., combines high speed with unusual precision.

Projection Welder Makes Many Simultaneous Welds

A RESISTANCE welding machine, designed to have the same strength as a forming press and built to machine tool standards of workmanship and accuracy, has been brought out by the Taylor-Winfield Corpn., Warren, Ohio. This press welder, designated as type EX and shown in the accompanying illustration, embodies several new features, making it especially suitable for use when large numbers of projection welds are to be made at one time.

The transformer is of pancake design with water-cooled secondaries; it is so mounted that the inductance losses are reduced to a minimum, giving a high operating power factor. The machine can be furnished with transformer capacities of 200, 250, 300, 350, 400 or 450 kva., and with throat depths of 18, 24, 30 or 36 in. A nine-step self-contained heat regulator, mounted on the side of the machine, gives wide adjustment for various sizes of stock. Wide terminals are provided with ample space for supporting the welding dies. The lower knee has a vertical adjustment of 10 in.; it is supported at the outer end on heavy adjustable braces, eliminating all deflection.

The mechanical drive of the welder is simple and has a built-in speed control whereby any desired speed from 7 to 54 strokes a min. may be had by turning the handle on the side of the frame. Drive from the motor is taken through an infinitely variable speed transmission, giving a three to one speed variation. A pair of pick-off gears is provided so that by merely reversing the gears the machine is stepped up to the high speed range, which will give the maximum speed of 54 strokes a min. This high speed would be used, of course, only when the machine is working at the short stroke and on light gage metal.



Pressure is applied to the slide by a cam with a toggle directly in line with the center of the slide. The pressure spring, also directly in line with the center of the slide above the toggle, is accessible for adjustment or change. Any pressure up to 8000 lb. may be applied to the slide. Positive return action of the welding slide is actuated by another cam.

A stroke-changing device gives adjustment for any length of stroke between 1 in. and 2⅔ in. This feature makes it possible to handle shaped or flanged stampings and to weld plain flat stock with the same machine. By changing dies and shortening the stroke, the speed may be increased so that a much greater production is obtained than if a fixed stroke unit were used on certain types of work.

The welder is equipped with "flexo-mechanical" clutch control, which consists of a flexible cable and foot pedal unit that can be moved around on the floor to the most convenient location for the operator. The cable releases the clutch, and positive action is assured when the pedal is depressed. If the pedal is held down the welder will run continuously, otherwise it makes one cycle only and stops.

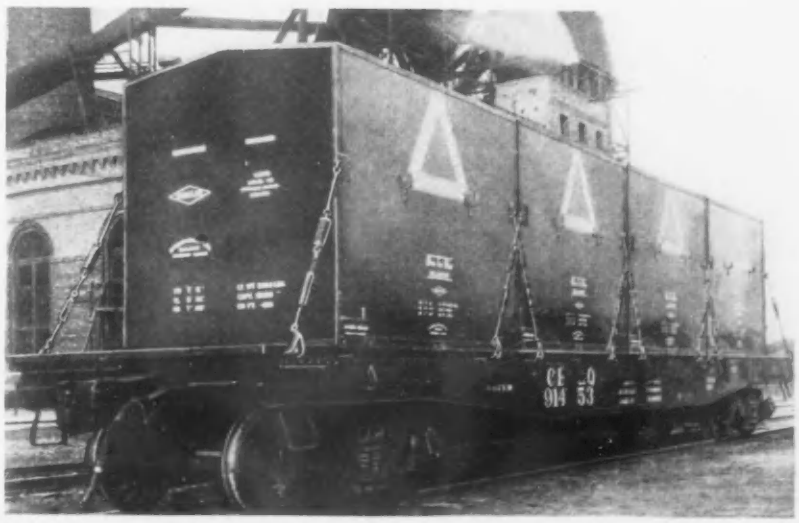
▲ ▲ ▲

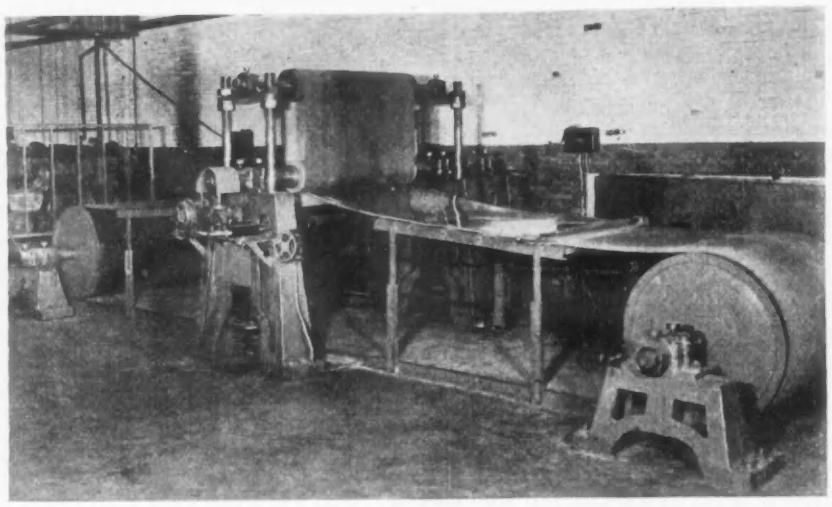
Unit Freight Carriers with Air Lift Wheels

UNIT freight carriers consisting of a steel framework with wall, roof and floor panels of Haskelite-plywood panels are being manufactured by the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., in two sizes having bulk capacities of 304 cu. ft. and 493 cu. ft., each with load capacities of 10,000 lb. They can be carried on any standard flat car, no special trailers being required.

Each carrier has its own wheels mounted on air-operated jacks which can be raised or lowered in 5 sec. There are two sets of four wheels, one set permanently alined at right angles to the other. These wheels are hidden in the four corners of the body and when the unit is on the flat car no weight is carried on the wheels. Air pressure from 70 to 80 lb. per sq. in. can be provided by an air pump or air reservoir installed as part of the truck equipment.

Spring hold-down clamps secure each unit freight carrier to the flat car and act as secondary draft gears by absorbing a large part of the horizontal shocks or impacts. Door openings are 5 ft. 10 7/16 in. high by 5 ft. wide. The 304 cu. ft. capacity carrier weighs 1760 lb. and the 493 cu. ft. carrier weighs 2280 lb.





Belt Grinder and Polisher for Rustless Sheets

FOR grinding and polishing all kinds of sheet metal, particularly rustless steel, a grinding and polishing machine having various new features has been brought out by the Schulte Grinding & Polishing Machine Co., 1958 West Forty-fifth Street, Cleveland. Rapid operation is an important advantage claimed. The sheet travels back and forth under a grinding belt on an endless conveyor belt to which it is clamped. This conveyor belt takes the place of the table commonly used with a polishing machine for this class of work. It is driven by a reversible motor controlled by push button and limit switch.

Two collapsible backing up rolls are located beneath the grinding belt and these with a lower roller on which the grinding belt revolves provide three-center grinding. This arrangement, it is stated, avoids the burning of the sheets, allows a certain amount of flexibility and prevents so-called sagging marks.

The grinding and polishing belt or grinding wheel, if one is used in place of the belt, has an oscillating motion of ½ in., 110 times a minute, in order to avoid the production of deep straight scratches on the work. Grinding and polishing with an oscillating belt, it is stated, makes the sheet easier to buff to a high mirror finish.

Several of the grinding and polishing units can be arranged in a train for continuous work, in which case the travel of the work is only in one direction, through the series of machines. It is stated that if ten machines are mounted on one foundation and connected by one large endless conveyor belt, one sheet 10 ft. long and up to maximum width can be ground every minute. For such continuous grinding the backing up rolls would be arranged to lower automatically and allow the sheet clamp to pass beneath the grinding belt. In that case the clamps would be released at the end of the last machine and would travel around the conveyor belt to the starting end where new sheets would be clamped on. The piece, on being unclamped, would leave the machine over a gravity roller.

The lower or driving shaft of the grinding belt has a rubber covering to allow resiliency and to take care of the tolerance in an uneven sheet. A framework with gravity rollers for supporting the conveyor belt is shown on the machine illustrated. For light gage material this is not required, however, as adjustments may be made to hold the conveyor belt in taut position. The belt is ½ in. thick, of non-shrinkable interwoven cotton.

The machine is so constructed that the shafts on which the grinding belt is mounted can be released and the belt replaced in eight minutes or less by two men with the aid of a hoist. A grinding wheel can be substituted for the belt if desired.

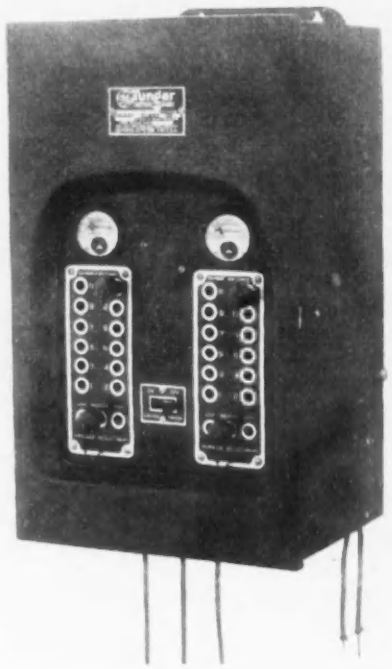
Two drums, 36 in. in diameter and 52 in. wide, one at either end of the machine, carry the conveyor belt. The distance between drums is 22 ft. Drive to the conveyor belt is by a 5-hp. motor, which is connected with a compound gear reducer and fitted with an electrically operated brake to allow the stopping of the belt at any point. The grinding belt is driven by a 30-hp. motor; it is oscillated by a 1-hp. motor through a vertical gear reducer and oscillating mechanism.

The machine has a capacity for grinding and polishing sheets 12 ft. long and up to 4 ft. wide, although, by allowing the sheet to overlap on one side of the conveyor belt, material 60 in. wide may be ground and polished. It is claimed that the machine will produce a finish equal to that of high finished cold-rolled strip on an ordinary pickled and cold-rolled sheet.

"Full-Wave" Battery Chargers

NEW 12-battery and 24-battery sizes of Tungar "full-wave" battery chargers, placed on the market by the General Electric Co. merchandise department, Bridgeport, Conn., embody a number of improved features. The control is of plug-in type with a new automatic relay that prevents damage to the batteries because of alternating-current line failure or short circuits. It is stated that the regulating panel is so arranged that the charger can be operated by anyone without previous experience.

An improved four-way charging system is employed on the 24-battery set, enabling it to charge batteries on either half or full-wave, or a combination of both at the same time. This set is intended for use in large battery service stations or in a garage



servicing a fleet of motor cars or trucks. Standard Tungar bulbs are employed in both 12-battery and 24-battery sets of this type.

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Seamless Pipe Fittings for Welding

A COMPLETE line of seamless steel welding pipe fittings has been brought out by the Taylor Forge & Pipe Works, Chicago. All ends are machine tool beveled to 45 deg. The elbows have tangents and are obtainable in both standard and long radius types. Having the same overall dimensions as screwed fittings, the standard elbow for welding occupies a minimum of space and makes for economy.

Die Casting Institute to Sound Out Members on National Economic Plan

WASHINGTON, Dec. 1.—Much interest is shown here in the proposal of the American Die Casting Institute to undertake a survey of its industry looking to effective economic planning. It was with this end in view that a committee of the institute recently called upon Secretary of Commerce Lamont and other officials in the Department of Commerce to discuss problems of the industry.

COMMITTEE of the American Die Casting Institute which conferred with Secretary of Commerce Lamont and other Government officials on economic planning for die casting industry. From left to right: Charles R. Murray, president, Barnhart Brothers & Spindler, Chicago, a former president of the institute; H. R. Rinehart, Philadelphia, the institute's secretary, and W. G. Newton, president, Newton Die Casting Corpn., New Haven, Conn., and president of the institute.

The committee was assured that the Bureau of Foreign and Domestic Commerce stands ready to assist it, and it is understood that the die casting industry will be sounded out to see if it will accept the cooperation of the bureau for the purpose of inaugurating a development program of nation-wide scope. If so, it will be the first industry to work out a program under the American economic plan outlined by Director Frederick M. Feiker of the bureau before the New York Trade Association Executives at New York, Oct. 30.

The institute committee which called at the Department of Commerce consists of W. G. Newton, president, Newton Die Casting Corpn., New Haven, Conn., and president of the institute; Charles R. Murray, president, Barnhart Brothers & Spindler, Chicago, a former president of the institute, and H. R. Rhinehart, Philadelphia, secretary of the institute.

The institute was organized in June, 1929, with 15 charter members, and, according to a statement made to Secretary Lamont by Mr. Murray, it now has 22 members whose sales in normal times represent 85 per cent of the total die casting business of the country. There are 40 die casting companies in the United States, he said, with total sales of $25,000,000 in normal years.

To Study Industry's Problems

The institute from the outset has been actively engaged in research and statistical work, but proposes to make a closer analysis of its problems in order to give it greater stability. One problem pointed out by Mr. Murray concerns the wide divergence of costs which have been submitted and were described by Mr. Murray as "appalling." He told the Secretary of Commerce that it would seem that the first constructive step in a program to aid the industry would be to have a survey made by the Department of Commerce.

Mr. Murray said that meetings are held quarterly by the institute in different parts of the country. The institute, he explained, has a two-year arrangement with Case School of Applied Science, Cleveland, under which it assumes one-half the expense of special equipment to conduct tests as to tensile strength at all temperatures, analyses, microphotography, impact, elongation, compressive strength, Brinell and Rockwell hardness, steam baths for accelerated corrosive tests. At the meetings, the institute has talks by experts on alloys, processes and the many phases of shop practice.

Warren, Ohio, Company Is Making "Steel Tile"

The Youngstown Pressed Steel Co., Warren, Ohio, a subsidiary of the Sharon Steel Hoop Co., Sharon, Pa., has begun the manufacture of "steel tile," which is expected to develop eventually into an industry that will consume thousands of tons of sheet steel annually. The Porcelain Tile Co., Chicago, which controls the patent rights, has assumed the sale of the new product, having established headquarters in Warren. The "steel tile" is manufactured by the Warren company under processes invented by George D. Haines, president, Porcelain Tile Co. High-speed automatic equipment has been installed by the Warren company for an annual capacity of 12,000,000 sq. ft. of white or colored bathroom tile, similar to clay tile.

W. G. Armstrong, assistant president of the Warren company, states that steel tile installations have been made or arranged for the Hollenden Hotel, Cleveland; Wardman Park Hotel, Washington; Standard Oil Co. laboratory in Cleveland, and elsewhere. Successful introduction of this product foreshadows similar developments in other products entering into house construction, he says.

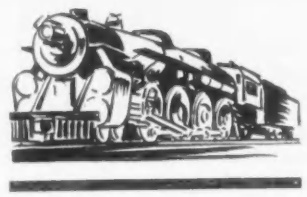
The tile consists of light gage sheet steel cut in sizes of ordinary bathroom tile. The surface is coated with vitreous enamel, either white or in colors. The edges of the pieces are pressed down. As a base for the steel, a thick composition board grooved with squares about 1½ x 1½ in. is manufactured by the Warren company. Ordinary sizes of steel fit over size squares and are fastened down with a special glue.

Despite unstable business conditions, the Warren fabricating plant is operating at a satisfactory rate, producing widely diversified products, including steel washtubs, washing machine parts, gasoline distributing pump parts, automotive parts and other steel products.

Rail Weaknesses

According to Dr. S. P. Timoshenko, research engineer, Westinghouse Electric & Mfg. Co., weak spots in railroad rails are in the fillet under the head and in the head itself. As a remedy he recommends greater radius of the fillet and more thickness in the upper half of the web, more lateral stiffness of the head and less eccentricity of the vertical load.

Railroad Wages Primary Issue; Carriers Oppose Pool Plan



Interstate Commerce Commission Hears Arguments Against Its Recent Decision—Shippers Also Appear

WASHINGTON, Dec. 1.—Arguments before the Interstate Commerce Commission last Saturday on the petition of the railroads for modification of the commission's decision in the so-called 15 per cent rate advance case centered largely on the pool plan. Other features, however, were given a fair degree of attention.

Generally, the commission pool plan has been considered to be a proposal to set up a fund from increased revenue arising from suggested increases in rates and to be distributed as a gift to the weaker lines. The railroads have insisted that the commission provision could be interpreted as setting up either a gift or loan fund. They attacked as illegal a gift fund and have proposed that it be made a loan fund to be operated by the suggested Railroad Credit Corpn. Shipper representatives maintained that the commission plan is for a gift pool and that it is entirely legal.

The suggestion of the carriers that proposed additional charges per car be converted into cents per ton was opposed by Attorney Charles E. Cotterill of the South Traffic League. He said the plan of the carriers to determine average car loadings on which to base added charges would be difficult to work out and would do away with the incentive to load cars to capacity.

Mr. Cotterill also opposed the suggestion of the carriers to change the commission provision regarding the treatment for less-than-carload freight. The commission proposed no increased rates for hauls of 175 miles and less, 1c. per 100 lb. additional for hauls of 175 to 250 miles and 2c. per 100 lb. additional for hauls of more than 250 miles. The carriers want to apply the plan in terms of existing class and commodity rates, regardless of distance. Mr. Cotterill declared that the railroad proposal would narrow the freight exempted of additional charge and also that which would take the 1c. extra charge, while broadening the traffic that would be subjected to the 2c. additional charge.

Rail Wages Primary Issue

As consequential as the carriers and the railroad security holders consider the attitude of the commission toward the petition, it is clearly viewed as being of only secondary importance when measured against the question of railroad wages.

The railroad brotherhoods oppose wage cuts. They have proposed a 6-hr. day with no decrease in rate of pay. The thought is that this would increase employment. The railroads oppose this plan. The result is that for the present negotiations are to continue between railroad brotherhoods and individual rail systems. Many think this is merely a temporizing and ineffectual procedure.

Assuming this belief proves to be correct, the steps ahead look to be difficult and uncertain as to outcome. They would entail the possibility at least of action through the United States Mediation Board, the courts, an arbitration board and an emergency board set up by the President, all with the result unknown at this time. The eventuality of a nation-wide strike might even be pictured, though it is thought to be remote.

Mediation a Long Procedure

Should present negotiations fail of their purpose, it is expected that the railroads will apply to the mediation board for its services. In case it is unable to adjust the differences between labor and the carriers, the next move would be for arbitration. The board of arbitration may be made up of three or six members, each side sharing equally in their selection. Where disagreement develops, the board of mediation would select one member if but three are to be named.

The award of the board of arbitration follows careful investigation of points in dispute and is filed in the Federal District Court. Ten days afterward the court approves or disapproves the judgment. Its action is binding unless the case is taken to the Circuit Court of Appeals.

But arbitration is not compulsory. If it is declined, the board of mediation reports to the President if, in the opinion of the board, the dispute threatens to hamper interstate commerce in any section of the country. The President, at his discretion, can set up an emergency board of as many members as he sees fit. The finding of this board is not binding. In the past, however, the high character of its membership, together with the force of public opinion, has proved effectual in ending labor disputes.

In case arbitration is sought by the carriers and is declined by labor, the latter is enjoined from going on strike for at least 30 days after such negotiations have been refused.

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Freight Rates from East to Middle West Reduced

A complete revision of the rates on iron and steel articles, carloads and less, from various Eastern points to destinations west of the Mississippi River is effective Dec. 3. For example, the present and new carload rates to Kansas City, Mo., per 100 lb., are as follows:

Point of Origin	Present Rate	New Rate
Pittsburgh	68.5c.	57c.
Johnstown	71.5c.	59c.
Lackawanna	69.5c.	59c.
Bethlehem	78.5c.	69c.
Sparrows Point	77.5c.	67c.
Chicago	42.8c.	42c.

Generally speaking, the new tariff will establish the Missouri River as the breaking point for rates instead of the Mississippi River, which has heretofore been the breaking point. In other words, rates from Eastern mills to points in the Southwest up to this time have been made up of a combination of two rates. One of these rates was the local rate from the Eastern mills to the Mississippi River and the second rate, which was added to this first rate, was the local rate from the Mississippi River to destination.

Under the new tariff, the first rate from Eastern mills will be to the Missouri River instead of to the Mississippi River. This will result in savings to Eastern mills.

To offset this decreased rate to destinations, the Eastern mills will lose part of the fabrication-in-transit advantages which they have heretofore possessed as against tonnage originating from Chicago and other Midwestern points.

Rates to St. Louis are not affected.

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Illinois Rates Suspended for Four Months

The Illinois Commerce Commission has suspended, for four months, tariffs filed by all Illinois railroads proposing general increases in all class rates for freight transportation in the State. The carriers had also proposed to make the new rates subject to the official classification which the commission believes would destroy the present competitive relationship between Illinois industries and those situated in States east and west of Illinois.

Offers Unemployment Insurance Plan for "Stable" Workers

James W. Hook Tells Mechanical Engineers Uniform Plan for Given Competitive Groups Is Feasible

AN unemployment insurance plan for stable workers, as contrasted with unemployables and casual or nomadic labor, was outlined by James W. Hook, president, Geometric Tool Co., New Haven, Conn., in an address before the American Society of Mechanical Engineers at New York Dec. 2.

Mr. Hook estimates that 25 per cent of the unemployed are unemployable and should be cared for by charity, as at present. Another 35 per cent are made up of unstable or nomadic workers and should be provided for by work relief supplied for previously planned public works. The remaining 40 per cent are stable employees and should be assisted by the employer through the medium of reserves accumulated during good years as an insurance against periods of low employment. The reserves would be used not only for unemployment benefits, according to Mr. Hook's program, but also for group life insurance and the payment of liberal dismissal wages to those dropped from the payroll entirely.

What Are Stable Employees?

What are "stable" employees? Mr. Hook believes that this should be determined by each branch of industry for itself. His own view is that such employees include those (whether on salary or wage) who have been continuously on the payroll for a year or more. But he says that special consideration should be given to others who can be shown to have been resident in a community for two years or more, who have been steady workers in not more than three places in that time, and have not been dismissed for bad conduct.

When the stable force has been selected and rules for admitting new members to it have been established, the cash reserve fund should be created for the following specific purposes:

1. To augment the income of stable workers whose earnings, calculated on an annual basis, would amount to $4,000 each or less, so that their weekly incomes will not decline more than 40 per cent for those with dependents or 60 per cent for those without, during any 12-month period, except in cases of—
   (a) Voluntary absence, resignation from the company, or death.
   (b) Dismissal that requires payment of dismissal wages.
   (c) Involuntary absence that is compensable.
   (d) Absence because of strikes or labor difficulties.
   (e) Absence for disciplinary purposes, and
   (f) Absence for non-compensable illness, in which case benefits should be paid at the rate of not more than half pay for 10 weeks beginning after an absence of 14 calendar days. No benefits shall accrue for the first two weeks and payments thereafter shall be made only upon doctor's certificate. If, after a siege of illness, the afflicted must be dismissed entirely, then he shall receive a dismissal wage in addition to illness benefits already received. Dismissal wages shall also be paid to those who are dismissed on account of compensable illness or affliction.
2. To enable companies that have seasonal work to do, to maintain their wage bills for that class of workers at 60 per cent of the amount paid during the previous year.
3. To pay dismissal wages to stable workers, except when dismissed for bad conduct, at the rate of half pay for a period of 20 weeks for those who have been in the employ of the company 20 years or less, and two additional weeks for every year of service over and above 20 years.
4. To pay premiums on group life insurance in the amount of $1,000 for all employees who have been on the payroll a year or more.

The reserve, according to Mr. Hook's plan, would be in cash, representing a percentage of the total payroll and would be placed in the hands of a trustee, under definite provisions that protect it from diversion to other uses. It would be checked monthly with the record of stable employees to determine its adequacy.

Overcoming Competitive Disadvantage

To overcome competitive disadvantage, all units in a competitive field should follow the same rule for determining who their stable workers are and should set aside proportionately the same minimum cash reserves for unemployment relief. This could be done, in Mr. Hook's view, through industrial conferences under the auspices of the United States Department of Commerce, following the procedure that was used successfully in considering and agreeing upon simplification.

To obtain authority to cooperate in this way, Mr. Hook recommends that the Federal Trade Commission act and other laws be amended. He likewise recommends that State laws be enacted to provide penalties for the misuse or misappropriation of employment reserves.

Each employing unit, according to Mr. Hook's plan, would provide its own reserves just as it now provides for its own individual tax reserves. He is opposed to group centralization

or consolidation of reserves. If large sums were centralized, he points out, their liquidation would act as a terrible weight on the financial structure, tending to further depress prices, increase bank failures and prolong depression.

When a company goes out of business for any cause the reserve fund, according to Mr. Hook's plan, would be used to pay dismissal wages. Any balance would be returned to stockholders. When a company consolidates with another, the funds of both would be drawn upon respectively to pay dismissal wages to stable workers and to assist seasonal workers thrown out of employment. The balance would be consolidated into one employment reserve for the merged company.

Does Not Penalize Workers Taking Other Employment

The problem of protecting the contributions of the employee who leaves one company to go to another has to be dealt with only in case both employer and employee participate in building up the reserve fund. Mr. Hook says that from a dollar and cents standpoint it makes little difference whether one or both pay, since industry pays the bill and passes it along to the customers regardless. But where a participating plan is in vogue requiring equal contributions by employer and employee, the employee would start contributing the moment of his employment and, in case of his subsequently leaving, the amount he has contributed over and above one-half the benefits to which he is entitled, plus interest accumulations, would follow him. It would go either to the company by which he is next employed, to himself in case of retirement from active work, or to his executor, administrator or assigns in case of death.

Reserves, according to the Hook plan, would be based on the arbitrary theory that a major depression will come once in every seven years. If an error in calculation is made or a major depression comes sooner than in seven years, and it can be shown that the employing unit honestly lived up to the requirements as agreed upon, then the funds should be apportioned as equitably as possible. Thereafter the inadequacy would be taken into account and the reserve increased accordingly.

J. I. Case Co. Adopts Job Insurance Plan

J. I. Case Co., Racine, Wis., farm machinery manufacturer, has announced an employment insurance and savings plan. Workers wishing to build up a reserve to tide them over future periods of unemployment will pay 5 per cent of their wages into a savings fund. The contributions of the workers will be met dollar for dollar by the Case company.

Payment at the rate of 5 per cent will continue until there has been deposited to an individual's credit a sum equal to his wages for six months. Then payments will be cut to 2 per cent and a similar reduction will be made by the company. Payments will cease when the amount deposited equals a year's wages.

In the event of unemployment the worker will be paid out of the fund at the rate of 40 per cent of average earnings. If a worker leaves the employ of the company of his own volition, the money credited to him will be paid on demand.

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Britain to Modernize Mills and Furnaces

With the return of financial confidence, a program of development and modernization of steel mills and blast furnaces in Great Britain is probable, according to George B. Garrett, sales engineer, Arthur G. McKee & Co., Cleveland, who has just returned from a five months' stay in England.

While in Great Britain, Mr. Garrett visited the leading iron and steel plants throughout the country. The overwhelming victory of the National government already has brought improvement in business sentiment and an actual gain in business activity in many lines, Mr. Garrett said.

"One of the constructive moves in the iron and steel trade probably will be a general rationalization of industry, whereby the leading companies will be formed into groups according to geographic location, with one outstanding company in each district as a nucleus," said Mr. Garrett.

"Early attention will be given to the blast furnace branch of the industry which has been neglected for years and where there are large opportunities for immediate reductions in cost. The extremely large furnace does not fit in with English conditions, as plants there must be more elastic as to output to cater to an ever-changing export market.

"One very encouraging sign for the British steel industry is the appearance in blast furnace operation of younger men, who are more receptive to changes and modern methods of doing things. This change has been marked in the last 10 years.

"It is a mistake to think that England, as a factor in world trade and finance, is done. The British people have come through ten years of depression with less lowering of morale than Americans have experienced in one or two years. While England has some tremendous problems to solve, the recent election is a sample of what the British people can do when they are face to face with a crisis."

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Scrap Dealers to Confer on Export Association

The Boston chapter of the Institute of Scrap Iron and Steel, at a meeting in Boston Nov. 24, requested that Benjamin Schwartz, director general of the institute, call a conference after Jan. 1 of all scrap iron dealers interested in the export of scrap, for the purpose of considering the organization of an export association under the Webb-Pomerene law.

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Fabricated Steel Plate Orders Off in October

WASHINGTON, Dec. 1.—Orders for fabricated steel plate in October declined to 20,664 tons from 33,473 tons in September, according to reports received by the Bureau of the Census from 51 manufacturers. In 10 months of the year, bookings totaled 267,624 tons, against 409,435 tons in the corresponding period of last year.

October orders were distributed as follows: Oil storage tanks, 1955 tons; refinery materials and equipment, 2076; gas holders, 102; blast furnaces, 200; miscellaneous, 16,331.

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Continuous Sheet Rolling Patented in Germany

The American Rolling Mill Co., Middletown, Ohio, has been granted a German patent for its continuous sheet mill development.

The German patent office is conducted upon different principles than that of the United States. Before patents are granted, they are made public to invite opposition by interested persons or companies. This information is given careful consideration.

In this way the examiners of the German patent office are informed of processes and shop practices that have not appeared in the technical or patent literature. To fulfill the requirements, a German patent must be a new and distinct contribution to the art.

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A large walking beam pack heating furnace is being installed by the Surface Combustion Corpn., Toledo, Ohio, in the Weirton, W. Va., plant of the National Steel Corpn.

Honors Bestowed by Mechanical Engineers

Honorary membership was given by the American Society of Mechanical Engineers, meeting this week in New York, to Dr. Palmer C. Ricketts, for thirty years president of Rensselaer Polytechnic Institute, "as a great engineering educator, and in recognition of the debt which the engineering profession owes to engineering educators."

Calvin W. Rice, secretary of the society for twenty-five years, was also made an honorary member.

The society's Gold Medal was awarded to Albert Kingsbury, president, Kingsbury Machine Works, Inc., Philadelphia, for research and development work in the field of lubrication. The Melville Medal, established in 1914 in honor of Rear Admiral George W. Melville, a past president of the society, went to Arthur E. Grunert, Chicago, for a thesis on "Comparative Performance of a Pulverized-Coal-Fired Boiler Using Bin System and Unit System of Firing."

Robert E. Klise, University of Michigan, received the Charles T. Main award for a paper on "Interchangeability—Its Development and Significance in Industry." This award is given to a student of engineering for the best paper within the general subject of the influence of the profession upon public life.

M. K. Drewry, Milwaukee, won the junior award, presented for the best paper or thesis submitted by a junior member of the society, for a paper on "Radiant-Superheater Developments." The winner of the annual student award is Jules Podnossoff, Polytechnic Institute of Brooklyn, whose paper was entitled "Pressure and Energy Distribution in Multi-Stage Steam Turbines Operating Under Varying Conditions."

Three John Scott Medals, awards of the City of Philadelphia to members of the society, "for inventions that will be useful to mankind in the development of chemical, medical, or any other science, or development of industry, in any form, the test being that the invention is, in the judgment of the trustee, definitely accomplished, and that it may add to the comfort, welfare, and happiness of mankind," were given to:

Albert H. Emery, Jr., A. H. Emery Co., consulting engineer, Stamford, Conn., "for the invention of the Southwark-Emery testing machine, a mechanical device for testing materials."

Willis H. Carrier, president, Carrier Engineering Corpn., Newark, N. J., "for the invention of process and apparatus for cleaning, purifying, and humidifying the air."

Albert Kingsbury, president, Kingsbury Machine Works, Philadelphia, "for the invention of a thrust bearing for use in ships and heavy machinery."

OFF THE ASSEMBLY LINE

Three Largest Motor Car Makers Now Placing Steel Contracts

DETROIT, Nov. 30.

THE current week is of great import to the steel trade, as the three largest automobile companies—Ford, Chevrolet and Chrysler, producing 75 per cent of the industry's output—are about to place their first quarter steel contracts. These are of a blanket nature, with tonnage releases to be specified as required. Of immediate concern is the fact that two of the makers, namely, Ford and Chevrolet, are expected to give steel orders for December rolling, thereby bolstering somewhat a drooping mill program during the final month of the year.

Although it had planned to place its first quarter steel contracts today, the Ford Motor Co. has delayed its decision until later in the week. About 10 days ago all steel companies submitted quotations on the Ford business, which ranges from 100,000 to 300,000 tons, and from day to day have been expecting action on the part of Ford officials. It is understood that the tonnage will be more widely distributed than heretofore so that as many steel producing centers as possible will benefit.

While manufacture of Ford parts both at Rouge and at plants of suppliers should get under way by Dec. 15, it is believed that few cars will be assembled before January. The company is confronted with the necessity of stocking parts at branch assembly plants before assemblies begin on a production basis. Suppliers still are waiting for shipping releases on orders placed 30 to 60 days ago.

Signs of increased automobile production in southern Michigan are multiplying. In the first half of November employment in this city increased 20 per cent and the latter part of the month, for which definite figures are not yet available, showed another substantial gain. With Chevrolet getting into the production swing and Fisher Body and Buick going well, Flint continues to be one of the busiest automotive centers. Pontiac is feeling the stimulus of renewed activity on the part of the Oakland company, while Muskegon and other cities in western Michigan are busier as parts makers get releases for orders for new models.

November automobile output in United States and Canada estimated at 75,000 to 80,000 units, December at 125,000.

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Ford, Chevrolet and Chrysler are about to place first quarter steel contracts.

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New Chevrolet will feature synchro-mesh transmission, selective free wheeling, modified stream-lined body. Prices will show little change.

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Prior to close of Lake navigation, motor car makers are stocking pig iron and steel brought in by water at saving of $2 to $3 a ton.

Chevrolet Plants Busy

There is feverish activity at the various Chevrolet plants, which are now on a production basis for the new car. Scheduled for its initial showing next Saturday, Chevrolet is to feature synchro-mesh transmission combined with free wheeling. With deeper-crowned fenders, slanting windshield and absence of an outside sun visor, the body has a leaning toward the stream-line effect, although there are no radical extremes. It is reported that the wheelbase remains unchanged at 109 in.; however, the car is said to look longer, lower and more powerful than this year's models. It is understood that Chevrolet will have a "stabilized" front-end construction; that is, the fenders, radiator and headlamps will be carried on a single fender support unit which is anchored to the center of the front cross-member of the frame, thus reducing the weaving and vibrating of the front end. This is an innovation in the automobile industry. The 60-hp., six-cylinder engine is mounted at the four corners on rubber held in a stamped container, this insulation eliminating vibration. This is relied upon by Chevrolet to meet successfully the Plymouth floating power idea. Prices are expected to remain at about the present level. Instead of lowering prices, Chevrolet is adhering to the principle of building more value into its car. The company will make slightly less than 40,000 cars in December.

The Hudson Motor Car Co. is slowly expanding the manufacture of the new Hudson and Essex cars, with a number of production kinks yet to be ironed out because of the radical nature of the changes. Under the circumstances, it is doubtful whether the 1932 models will appear before the New York show. It is said that there will be a more marked difference in value than in the last year between the Essex and the Hudson, this being accomplished by increasing the size and weight of the latter. It seems likely that there also will be fewer parts interchangeable on the two cars. Judging by the vigorous, aggressive advertising campaign started recently by the Hudson company, one may expect a forceful merchandising campaign next year on behalf of the two cars.

Plans of Other Makers

Rockne Motors Corpn. has been organized as a subsidiary of the Studebaker Corpn. to make the new Rockne Six, about which there has been so much speculation in Detroit. Two different lines, one having a 110-in. wheelbase and the other a 114-in. wheelbase, will be manufactured at Studebaker's South Bend and Detroit

plants, with shipments commencing in December. The smaller car, to be known as the Rockne Six Sixty Five, is priced at $585, f.o.b. factory, and the larger car named the Rockne Six Seventy Five at $685. Nine models will be offered, featuring free wheeling with synchronized gear shifting, automatic starting, X type frame and rubber cushioned motor to prevent vibration. The Six Sixty Five has a 65 hp. engine and the Six Seventy Five a 72 hp. motor.

Aerodynamic bodies include sloping windshields, stream-lined tops and air foil apron concealing the fuel tanks. The radiator is of the sloping type.

Reo is expanding in the truck field by presenting a line of semi-trailers. Little change is anticipated in the Reo Royale, which already has been imitated by several competitors, so far as body design is concerned. In this respect, Reo along with Auburn-Cord was about a year ahead of the rest of the industry. Chrysler, DeSoto and Dodge are to concentrate attention on transmission and body changes. Little news has come from Auburn about its plans, although it is known that the engine made by Lycoming is to be higher powered the coming year. A new Nash is reported in the offing, despite the fact that current models were first shown only last summer. Cadillac is preparing new cars emphasizing the stream-line effect in the body. It is expected to put further emphasis on its 12-cylinder jobs, which were an outstanding success this year.

What Oldsmobile and Oakland-Pontiac will do remains unsettled. Both Oldsmobile and Pontiac did relatively well during 1931 and naturally General Motors is eager to maintain their present standing. Willys-Overland is understood to have a fair production schedule for December. A 12-cylinder Lincoln with selective free wheeling will be revealed at the New York show. Graham-Paige will present shortly a stream-lined car to be called the Blue Streak. It will be priced lower than any previous car in the company's history.

Lay in Winter Stocks

As the end of the Lake navigation season is close at hand, several automobile companies have taken advantage of the opportunity to lay down enough material to carry them through the winter. Chevrolet has been piling pig iron brought by boat from Buffalo to its gray iron foundry at Saginaw, stocks now being in the neighborhood of 50,000 tons. Chevrolet and other companies likewise are stocking steel bars, which have been transported here by water from Chicago, Buffalo and other points at a saving of $2 to $3 a ton compared with an all-rail haul. Trucking of steel, particularly sheets, from district mills to automobile companies in southern Michigan, especially at Pontiac and Flint, has increased considerably in recent months. Steel companies are agreed that the percentage of steel shipped into the Detroit area by water has shown a gain this year over 1930 and next year will register a further increase.

The trend toward steel bodies for motor cars continues. Officials of the Edward G. Budd Mfg. Co. are of the opinion that this movement has been accelerated by new methods of silencing as well as ability to form the sheet metal structural units in such a way as to take full advantage of the superior characteristics of steel in the matter of strength and likeness. Improvements in dies and developments in the art of flash welding have reduced the number of parts entering into the body and have produced lighter and stronger sections. Joseph Ledwinka, Budd's chief engineer, estimates that a saving of 150 lb. in weight has been made in the average sedan manufactured by his company as the result of utilizing the new methods. Silence is obtained in the bodies by cementing to the inner side of door panel surfaces and other parts a non-resonant material known as "Silentor." The gain in steel tonnage is not confined to automobile bodies, as steel wheels also are making steady gains. They now constitute about 90 per cent of all the wheels made for the industry. There is a strong belief in automotive circles that the all-steel wheel is not a mere fad to be replaced with changing fashions, but is here to stay as a permanent improvement.

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Operating Men Inspect Great Lakes Plant

A feature of the conference of open-hearth men at Detroit last week was a visit on Tuesday afternoon to the new plant of the Great Lakes Steel Corpn. at Ecorse, a suburb of Detroit. Nearly 100 men went down in two buses and several private cars, and inspected not only the open-hearth department, which was the point of particular interest, but also the rolling mills.

As described in THE IRON AGE of Nov. 27, 1930, this plant includes six 150-ton stationary open-hearth furnaces, fired with oil, and housed in a building 208 by 770 ft. Regenerators are plated in to avoid infiltration of air, and every precaution is taken to insure economical operation.

Hot metal arrives from the Hanna Furnace Corpn. stacks at Zug Island, several miles away, in 110-ton mixer-type ladle cars. The iron is charged into the furnaces by means of 75-ton ladles handled by a 125-ton overhead traveling crane. On the pouring side heats are handled by two 250-ton ladle cranes, which are among the largest in existence. Exceptionally large waste-heat boilers between furnaces and the 180-ft. stacks furnish steam for a variety of purposes.

Ingots are broken down in a 40-in. blooming mill operated by a 7000-hp. reversing motor. The blooms and slabs, either with their own heat or after being reheated in an intermediate furnace, are passed through any one of four rolling mills.

A continuous strip mill in line with the blooming mill has 13 stands of rolls, of which four are two-high, six are four-high, and three are edging sets. These stands are operated by nine motors aggregating 18,800 hp. and are capable of rolling strip up to 32 in. wide. Two features of particular interest are optical means of insuring that the slabs enter the continuous mill, after the roughing treatment has broken off the scale, each at the same temperature; and the flying shear cutting off lengths as the material passes between the cutters at a speed of perhaps 1500 ft. a minute.

While the pyrometer treatment results in marked uniformity in gage of the hot-rolled steel, for it is said to operate within 5 deg. F. of the desired temperature, it delays the progress of steel through the mill in a way which might prove troublesome were it not that the mill is of such high speed. The pyrometer, focused upon the glowing steel, releases it to the mill as it cools to a predetermined temperature.

Parallel with the continuous strip mill is a sheet, bar and billet mill, consisting of nine two-high stands and two edging stands and operated by four motors aggregating 13,000 hp. In the merchant mill building are a 14-in. mill and a 10-in. mill, the latter only recently completed.

While this plant is so situated as to serve the Detroit district directly with much of its steel, it does not make sheets, which are in such great demand for automotive work. Through a working arrangement with its affiliate, the Michigan Steel Corpn., however, sheet bars made at Great Lakes are rolled into sheets at the Michigan plant, and passed thence to the automobile works.

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October Motor Car Output Declined

WASHINGTON, Dec. 1.—Output of motor vehicles in the United States in October declined to 80,142 units from 140,566 in September, according to reports received by the Bureau of the Census. The October production consisted of 57,764 passenger cars, 21,727 trucks and 651 taxicabs. In the first 10 months of the current year the production of motor vehicles was 2,199,330, against 3,063,531 in the corresponding period of last year.

The Canadian production in October was 1440, comprised of 761 passenger cars and 679 trucks, and reflected a decline of 1206 under September. In the first 10 months of 1931 the output was 78,942, against 143,163 in the corresponding period of 1930.

... PERSONALS ...

BOYD FISHER, for many years consultant in scientific management, has been appointed general manager of the National Machine Tool Builders' Association, Cincinnati, effective Dec. 15. Soon after his graduation from Harvard University with the degree of A.B. in 1910, Mr. Fisher became active in management work as manager of the Efficiency Society and later as vice-president of the Executive Club, Detroit. During the war, he was commissioned captain in the Ordnance Department and was assigned to organizing the training of employment managers for the departments of War, Navy, Labor and for the Shipping Board. He returned to Detroit in 1919 as director of personnel of the Aluminum Castings Co., Cleveland, and served also as assistant works manager of the Detroit plant. Since 1920, Mr. Fisher has been engaged in personnel work for a number of companies and has served as consultant in management problems. He has been identified with the receiver division of the Irving Trust Co., New York, since January, 1930.

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E. T. WEIR, chairman of the National Steel Corpn., Pittsburgh, and DR. EDWARD R. WEIDLEIN, director of the Mellon Institute of Industrial Research, Pittsburgh, have been elected members of the board of trustees of the University of Pittsburgh.

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ROBERT LINCOLN O'BRIEN, of Boston, has been appointed by President Hoover as chairman of the Tariff Commission to succeed HENRY F. FLETCHER, resigned.

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ERNEST H. GEYER, member of home office staff, Truscon Steel Co., Youngstown, has been appointed district manager of the company's Milwaukee office at 605 Straus Building.

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JAMES A. BELL, general master mechanic for the Illinois Steel Co., at Joliet, retired Dec. 1, at the age of 70. Mr. Bell entered the employ of the company, which was then the Joliet Steel & Iron Co., in 1888 as a machinist. He was made general master mechanic in 1910.

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GEORGE SPELLMAN, until recently associated with the Gillette Safety Razor Co., has been made purchasing agent of the William L. Gilbert Clock Co., Winsted, Conn. Mr. Spellman was identified with the Winsted company 11 years ago.

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WILLIAM VAUGHAN, formerly general agent of the Heintz Mfg. Co., Philadelphia, has become affiliated with the Hill-Chase & Co., Inc., Philadelphia, in the sheet sales department.

WILLIAM M. CULBERTSON, heretofore identified with the Wheeling Steel Corpn. as special representative, has been placed in charge of sales of oil country tubular products by the International-Stacey Corpn., which recently became distributer of these products for the Wheeling company. He will make his headquarters at Columbus, Ohio.

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JOHN J. SUMMERSBY, JR., formerly in charge of sales at the Holyoke, Mass., works of the Worthington Pump & Machinery Corpn., Harrison, N. J., has been appointed assistant general sales manager, in charge of resale activities. He will have under his direction, as division managers, GEORGE B. CUMMING, resale and meter divisions; CARL F. OECHSLE, contractors' division, and CHARLES A. HIRSCHBERG, rock drill sales and service. THOMAS CRUTHERS continues as assistant general sales manager in charge of industrials, the position he has held since Jan. 1, 1930.

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RALPH N. ROBERTSON, until recently chief mechanical engineer of the Blaw-Knox Co., Blaw-Knox, Pa., has become associated with the Atwood Bradshaw Co., Pittsburgh.

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H. W. HAAPANEN, mining engineer, and who has been connected with the Fairmont Mining Machinery Co., and Consolidation Coal Co., has been made district representative in the West Virginia mining territory for the Webster & Weller Mfg. Companies, Chicago, makers of elevating and conveying machinery. His headquarters will be in Charleston, W. Va.

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HAROLD S. VANCE, vice-president in charge of engineering and manufacture of the Studebaker Corpn., South Bend, Ind., has been named president of the Rockne Motors Corpn., Detroit, a subsidiary of the Studebaker company recently formed to make the Rockne automobile at Detroit. In addition to his duties as head of the Rockne company, he will continue in his present capacity with Studebaker. R. A. VAIL has been appointed vice-president in charge of engineering and manufacture of the Rockne company. For many years he was a production manager of Dodge Brothers, Inc., Detroit, and later was vice-president of Durant Motor Co., Lansing, Mich. P. O. PETERSON has become treasurer and purchasing agent of the newly-formed company, having resigned as purchasing agent of the Studebaker company to take up his new work. R. E. COLE has been appointed Rockne's chief engineer. His long experience in the automobile industry includes service with the Chalmers company, Continental Motors Corpn., Dodge Brothers, Inc., and Durant Motor Co.

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HOWARD BRUCE, chairman of the board of the Worthington Pump & Machinery Corpn., Harrison, N. J., has been elected a director of the Baltimore & Ohio Railroad Co.

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V. T. MALCOLM, metallurgical engineer, Chapman Valve Mfg. Co., Indian Orchard, Mass., will discuss spark testing on Dec. 14 at a meeting of the Springfield, Mass., chapter of the American Society for Steel Treating.

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Metal Door Association Is Organized

The Associated Kalamein Products Manufacturers, Inc., has been formed to stabilize the kalamein door and steel buck industry in the New York area, according to announcement by Morris D. Kopple, general counsel for the industry. Harry H. Gross, Leonard Sheet Metal Works, Inc., has been made president; George H. Norman, Norman-Seton, Inc., first vice-president; Alfred Held, Reliance Bronze & Steel Corpn., second vice-president; Henry Kahr, Aetna Steel Products Corpn., treasurer, and Charles Landow, Landow Metal Products Co., secretary.

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A group meeting of foundrymen will be held by the Gray Iron Institute at the Home Club, Meriden, Conn., Dec. 11. The first of the series of these group meetings to be held this season took place in Cleveland, Nov. 24, having been attended by about 25 foundrymen from the northern Ohio district. Charles E. Mitchell, associate manager, and W. W. Kerlin, metallurgist of the institute, were the speakers. A. C. Denison, Fulton Foundry & Machine Co., Cleveland, presided.

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Surface Combustion Corpn., Toledo, Ohio, is installing a continuous gas-fired belt type hardening furnace for the United Carr Fastener Corpn., Cambridge, Mass. The furnace will be used for the hardening of small miscellaneous parts. Surface Combustion has also received orders for a pusher type slug heating furnace, to be installed for the Waterbury Mfg. Co., Waterbury, Conn. It is gas-fired with a tray pusher handling mechanism, and will heat brass slugs for forming operations.

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Production of galvanized pails and tubs in September was 110,253 doz., against 134,003 doz. in August, according to reports received by the Bureau of the Census from 13 establishments. September production of other galvanized sheet metalware was 32,276 doz., against 34,709 doz. in August.

Sharp Drop in Structural Steel Awards

WASHINGTON, Dec. 1.—Orders for fabricated structural steel in October reported to the Bureau of the Census totaled 99,173 tons, a drop of 59 per cent from reported bookings in September, amounting to 178,120 tons. Computed bookings in October were 110,000 tons as compared with 196,800 tons. Orders reported in the first 10 months of 1931 totaled 1,517,742 tons, compared with 2,100,362 tons in the corresponding period of last year. Computed bookings were 1,718,400 tons and 2,385,600 tons, respectively.

Reported October shipments were 106,569 tons as against 110,548 in September, while computed shipments were 145,600 tons as compared with 150,000 tons. Shipments reported for the first 10 months of the year were 1,145,884 tons as compared with 2,838,420 tons in the first 10 months of 1930, while computed shipments were 1,604,100 tons and 2,623,600 tons respectively.

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Gray Iron Castings Business Improves

While production of gray iron castings decreased slightly, there was an upturn in new business and unfilled orders, according to the monthly report of the Gray Iron Institute, based on data supplied by 126 foundries. Production in October was 47.6 per cent of normal, against 49.4 per cent in September. New business, which was 37.9 per cent in September, increased to 39.6 per cent in October, while unfilled orders were 29.7 per cent in October, against 29.4 per cent in September.

Increased activity is shown in the Pennsylvania, Michigan, Indiana and Ohio districts, and a decrease in Chicago, Wisconsin, Illinois and the area west of the Mississippi River. Three foundries reported business looked good, 37 fair, 49 poor and 37 bad.

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Baltimore Interests Buy McConway & Torley Co.

Sale of the business and good will of the McConway & Torley Co., Pittsburgh, to Donald Symington and associates of Baltimore has been announced by William McConway, Jr., president of the company. The McConway & Torley Co. was founded in 1868 by the late William McConway, and was a pioneer in the manufacture of malleable iron and steel castings, principally for the railroad trade. The company was also the sponsor of automatic couplers for cars and locomotives similar in design to the standard coupler of the American Railway Association.

The business of the company will be continued in Pittsburgh by the new interests under the name of the McConway & Torley Corpn., with no important changes in personnel. Donald Symington, president of the new corporation, has been identified with the railroad equipment business for several years as general manager of the several Symington companies engaged in the industry. He is chairman of the Locke Insulator Corpn., an associate company of the General Electric Co., president of the Baltimore Mail Steamship Co., and a director in the Western Electric Co., the International Mercantile & Marine Co., the Glenn L. Martin Aircraft Co. and the Colonial Radio Corpn.

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▲ ▲ ▲ OBITUARY ▲ ▲ ▲

JAMES ROWLAND, JR., formerly head of the Kensington Iron Works, Philadelphia, died at his home in Jenkintown, Pa., on Nov. 28, aged 60 years.

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WILLIAM SIMONS, general manager of the Cardiff-Dowlais works, Guest, Keen, Baldwins, Ltd., London, died on Nov. 26, aged 62 years.

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GEORGE P. STEPHAN, for over 56 years identified with the Hoggson & Pettis Mfg. Co., New Haven, Conn., maker of small tools, died at that city on Nov. 13. He had been president of the company since 1918.

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EDWARD A. WHALEY, one of the organizers of Edward A. Whaley & Co., Norfolk, Va., engineer, designer and machinist, now the Whaley Aircraft & Engineering Co., died on Nov. 5, aged 39 years. He was a graduate of Princeton University and had served during the war as a lieutenant, in charge of constructing aircraft hangars and bases.

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ALBERT BREYER, president, Breyer Brothers, Whiting & Co., Waupun, Wis., pioneer manufacturer of tanks, windmills and other steel farm equipment, died suddenly of apoplexy on Nov. 21, aged 68 years.

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WALTER S. MARVIN, vice-president and general manager, Metal Ware Corpn., Two Rivers, Wis., died Nov. 22, aged 44 years. He was born at Manston, Wis. He joined the Metal Ware Corpn. in 1928 after an association with the French Battery Co., Madison, Wis., first as manager of railroad sales and later as branch plant manager at Newark, N. J.

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DONALD FRASER, director and former vice-president, Chain Belt Co., Milwaukee, died Nov. 20, aged 78 years. He was engaged in the pattern manufacturing business in Minneapolis and Milwaukee for many years; in 1895 he joined the Chain Belt Co., where he became vice-president and works manager. He retired in 1917, but remained as a director. He was a director also of the Sivyer Steel Casting Co. and the Federal Malleable Co., Milwaukee.

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EDWARD F. HASBROOK, purchasing agent for the Chicago, Burlington & Quincy, died Nov. 22 at the Presbyterian Hospital, Chicago. He had been in the service of the railroad 43 years and for the past year had been purchasing agent. He was 69 years old.

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THOMAS HAMILTON, formerly superintendent of the Moore Stove Works, Joliet, Ill., died in that city on Nov. 9, aged 79 years.

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WILLIAM C. PRENDERGAST, formerly head of the foreign department of the New York office of the Republic Steel Corpn., died on Nov. 30 in New York as the result of a fall out of a window while fixing a radio aerial. He was 52 years old.

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JAMES G. LIDGERWOOD, vice-president of the Lidgerwood Mfg. Co., hoisting engineer, New York, died suddenly at his home at Morristown, N. J., on Nov. 30, aged 52 years.

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J. WALTER MILES, who was recently placed in charge of engineering for the Canadian Westinghouse Co., Ltd., died at his home in Irwin, Pa., Nov. 28. He was a graduate of the University of Western Pennsylvania and Cornell University, and had been identified with the Westinghouse company for 37 years. For a considerable time he was in charge of foreign engineering activity for the company.

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Typewriter Companies To Expand in Canada

Plans for installing or enlarging their manufacturing facilities in Canada have been announced by two American typewriter companies. The United Typewriter Co., Ltd., Canadian distributing and assembling representative of Underwood Typewriter Co., subsidiary of Underwood Elliott Fisher Co., will immediately build a plant for manufacturing Underwood machines in Toronto, Ont. The Remington Typewriters, Ltd., Canadian subsidiary of Remington Rand, Inc., will enlarge its factory space, according to C. F. Mattise, plant manager. The latter concern will also increase the output of steel filing equipment at its Niagara Falls, Ont., plant.

It is stated that these plans are the result of the new British tariff, which provides for duties up to 100 per cent on imports not manufactured in the British Empire.

Sensitive Barometers Still Point Downward

By DR. LEWIS H. HANEY
Director, New York University Bureau of Business Research

WHILE our figures are not yet complete for October, most of the data are in and clearly show a further sharp decline in the activity of the chief steel-consuming industries. The "composite demand line" fell to a new low in October, and went well below the bottom touched in 1921.

Only one of the factors, miscellaneous manufactures, stands at a higher level than was reached in the 1921 depression. Our index for this group, which excludes steel and automobiles, stands at 89.5, against 64.5 at its low point in 1921. The level of iron and steel exports is slightly lower than the 1921 low.

In all other cases the present levels are much under anything seen in 1921. For example, railroad freight traffic in October gives an index of 69.8, which compares with 77.6 in the earlier period. Automobile production, at 26.9, compares with 37.7.

Building activity is higher than the lowest point reached in 1921, but that point came at the beginning of 1921 and was followed by steady improvement. The tendency has been rather the reverse in 1931, and consequently the present index of 47.8 compares with the following indexes for January, July and October, 1921: 40, 61, 77.

The October decline in the composite demand line resulted from more than seasonal setbacks in building, miscellaneous manufacturing and machine tools, and automobile production. There were small increases in railroad freight traffic and in mining activity, but these were not sufficient to offset declines elsewhere. The increased freight traffic was due to grain and coal, the one being the temporary result of a speculative spurt in prices and the other a delayed seasonal movement in anthracite.

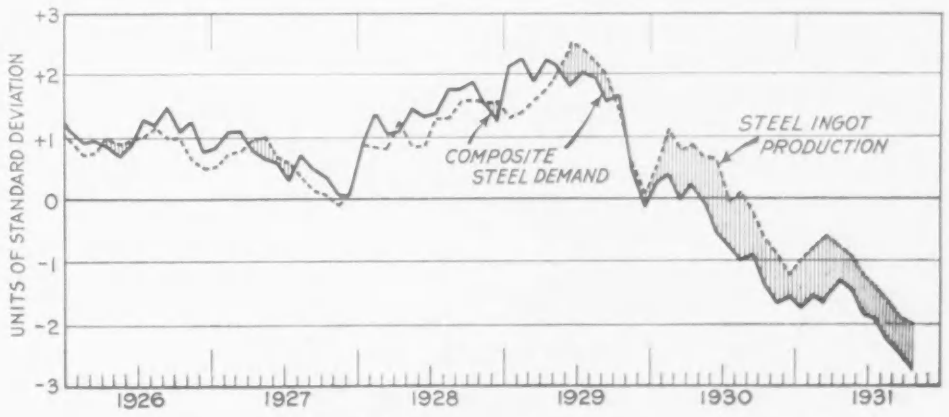
The outlook for steel business with the railroads is not such as to suggest much improvement. There is some prospect that the Interstate Commerce Commission will accept the proposal of the carriers as to the disposal of income from increased rates; in that event it is estimated that about $100,000,000 a year may be added to railroad revenue. The amount, however, must be problematical and there would doubtless be some necessary delay in putting higher rates into effect.

There will undoubtedly be a delayed seasonal spurt in automobile manufacturing in December, attending the bringing out of new models. Probably, however, the steel required for this activity has already been bought in large part. In any case the results as tested by sales are yet unknown. It may be surmised that, with the used-car business still so much of a factor and great pressure being brought by dealers to move their 1931 models, the demand for new models may be quite slow. The automobile industry is near the bottom-most bottom, but mass buying must await the turn in general business conditions and a reduction in unemployment.

Building activity, also, may be near the irreducible minimum; pessimists in this respect should remember that there is considerable modernization and shifting of residential areas and plant locations in prospect. But there is far from a general shortage of buildings, and financial conditions forbid any early resumption of speculative operations.

As indicated above, the chief factor which has supported business at a level higher than the low point in 1921 has been general manufacturing. This probably reflects most clearly the normal growth of the country and the continuous replacement demand for articles of consumption. Even machine tool orders, while low, are said to show some indication that the urge toward economies in production may involve considerable modernization of equipment, and inquiries have shown some increased interest for 1932.

The outlook for steel buying among the chief customers of the industry, however, as yet shows no definite signs of a turn for the better. Such sensitive barometers as orders for machine tools and sales of steel sheets still point downward. Judging by long-established precedent, there is likely to be no sustained gain in the demand for steel until improvement in these barometers occurs.



FURTHER spread between supply and demand is not a hopeful sign. Until a balance between them is struck we can scarcely look for sustained improvement in business.

Many Legislative Panaceas to Be Offered in Congress

But Large Number of Bills Will Be Introduced Merely for Political Effect—Higher Taxes Sure

WASHINGTON, Dec. 1.—The seventy - second Congress meets next Monday and promises to be marked by unusual turmoil. All sorts of legislative panaceas to "cure" the depression will be offered. Political discussion probably will be exceptionally heated and profuse. Largely, it will be pitched to the familiar tune of all Presidential and Congressional campaigns. Business is awaiting the session with apprehension. Nevertheless, it may well discount much that is ahead as being only political in character and negative in results. At the same time there will be a great deal of legislation enacted and some of it will impose added burdens on business. On the other hand, there are measures in prospect which will undoubtedly be constructive and helpful, some of which President Hoover has already indicated will be proposed.

Some of the highlights may be listed as follows:

Taxation—The Treasury deficit at the end of the present fiscal year is expected to total approximately $2,000,000,000, making additional taxation imperative. Indications point to levies on higher incomes, inheritances and gifts, and perhaps "selective" sales taxes, with the possibility of broadening normal taxes. The Treasury Department is said to have recommended special excise taxes to President Hoover. It is reported that the administration has decided to delay until the first of the year presentation of its tax program. Sum to be raised by taxation is estimated at from $500,000,000 to $1,200,000,000.

Unemployment—Probably proposals to relieve unemployment will outrank all others in prominence of discussion. Heavy appropriations are likely for public works and highway construction. There will be no dole. Bills for so-called economic planning, including the LaFollette measure for a National Advisory Council, with Federal supervision, will be hotly debated and have much support, though insufficient to overcome Presidential opposition. The administration, however, may be compelled to adopt an attitude of compromise on important measures and if not too radical they may reach enactment, some of them with distinct socialistic strain.

Financial—Special committee of the Senate Committee on Finance, headed by Senator Glass, Democrat, of Virginia, has begun work on program, part of it of an emergency character. The nature of it has been outlined from time to time by the President. It includes broadening of eligibility provision of the Federal Reserve act to embrace wider field of securities for rediscount in order to free additional frozen paper. But any liberalization of the provision apparently will be limited. There seems to be considerable support of the President's suggestion for increased capitalization of Federal Land banks and the setting up of a system of home loan banks, one in each Federal Reserve district, to give fluidity to frozen real estate paper and to prevent enforced liquidation of farm and home mortgages. Opinion is divided as to prospects of setting up Government Finance Corporation, like old War Finance Corporation, to make loans, some of which private banks are refusing to make. Branch banking within State lines and the setting up of a Government fund for immediate and partial payment to depositors having money in closed banks have a great deal of support. Stabilization features of the Agricultural Marketing act have been vigorously assailed and their repeal demanded, but the strong farm bloc in Congress probably will successfully oppose such action.

Regular Appropriations—Some of these probably will be cut in line with administration economy program. This is especially true of Naval appropriations. But little weight is given to talk of general slash in Government workers' wages.

Motor Bus Regulation—Legislation to this end appears to be probable. Time element and priority of other legislation are factors. The legislation contemplates control of interstate lines by joint boards of State commissions with right of appeal to the Interstate Commerce Commission on disputed points.

Tariff—Always a popular political subject, the tariff will be bitterly discussed pro and con, almost wholly for political effect. Legislation is improbable, though a strong drive will be made for a duty on petroleum.

Shipping—The Shipping Board has repeated past recommendations, some of which may finally get favorable action. Among them are those for additional regulatory authority over common carriers by water with relation to jurisdiction over minimum rates, restriction of common carrier services operated by private industries or by companies owned or controlled by such industries; amendment to coastwise laws, making it unlawful for foreign ships to engage in so-called "voyages to nowhere"; award of ocean mail contracts to purchasers of Shipping Board services; revision of mail pay schedules to provide higher rates for ships of exceptional speed; deductions from taxable incomes in cases where operating profits are devoted to new ship construction in American yards; transfer to privately-owned ships of peace-time business handled by army and navy transports and by Government-owned Panama Railroad Steamship line; aid for various classes of ships not now benefited by mail contracts; establishment of free ports.

Railroads—Any sort of legislation appears unlikely, chiefly because of lack of leadership in Congress.

Veterans' Bonus—Efforts for cash payment will be made, but probably without success.

War Debts.—One-year moratorium on war debts must be approved by Dec. 15, if foreign obligations are not to fall in arrears. Approval will be given after usual debate. Domestic economic conditions have strengthened opposition to further extension of moratorium, despite necessity to do so which some claim will be pressing. Any prospect of cancellation of debts which may have existed seems out of the question at this time.

Anti-Trust Laws—Business interests and organizations, including Chamber of Commerce of the United States, will seek liberalization of anti-trust laws and organized labor will urge passage of anti-injunction bill. Prevailing opinion seems to be that there will be no legislation in either direction, though, with its advocacy by the administration, loosening of the laws for the benefit of raw resources industries appears to have a fair chance of enactment.

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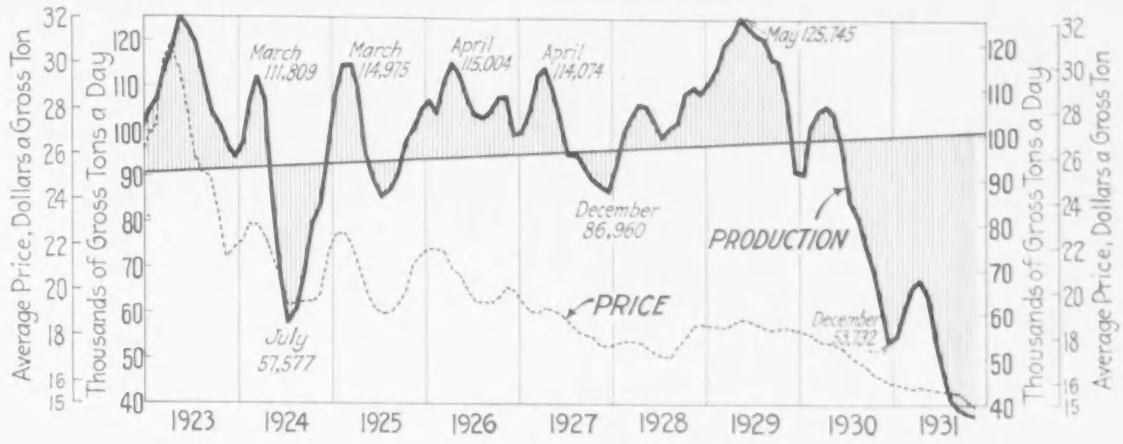
For the past several years, Dr. Charles T. Hennig, consulting metallurgist of the Pittsburgh Plate Glass Co., Barberton, Ohio, has introduced and developed the use of soda ash in the metallurgy of iron and steel. The highly basic and fluxing properties of soda ash is utilized in the product known as Hennig Purifier to produce cleaner and more uniform steel with superior rolling and working qualities. Supplementing United States patent No. 1,717,153 issued June 11, 1929, three additional patents have been issued to Dr. Hennig.



Pig Iron Output Declines Further

PRODUCTION of coke pig iron in November, returns being gathered by telegraph and telephone on Tuesday, amounted to 1,103,472 gross tons, an average of 36,782 tons daily. This compares with 1,173,283 tons in October and a daily average of 37,848 tons.

Both the daily average and the month's total make new low records for the past ten years, the most recent lower totals being those for September, 1921, at 32,850 tons daily and 985,529 tons for the month.

Furnaces in operation Dec. 1 numbered only 67, a drop of three from the 70 on Nov. 1, and reaching a point lower than that at the bottom of the 1921 depression, when 69 stacks were in blast on Aug. 1. The 67 furnaces now blowing are making iron at 35,810 tons daily, against 36,530 tons on Nov. 1.

Only three stacks were put in in November and six were taken out. In this whole list only one Steel Corporation stack figured, one Farrell furnace of the Carnegie Steel Co. in the Shenango Valley district having been taken off the bank. Two independent steel stacks went in:—"E" of the Bethlehem Steel Co. at Sparrows Point and "A" at the Campbell plant of the Youngstown Sheet & Tube Co. in the Mahoning Valley.

Losses of furnaces included three independent steel company and three merchant stacks.

Production of Coke Pig Iron and of Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1930	1931	1930	1931
January	2,827,464	1,714,266	27,260	14,251
February	2,838,928	1,706,621	21,310	19,480
March	3,246,171	2,032,248	23,345	27,899
April	3,181,868	2,019,529	27,777	25,456
May	3,232,760	1,994,082	30,296	23,959
June	2,934,129	1,638,627	27,327	11,243
½ year	18,261,312	11,105,373	157,325	122,288
July	2,639,537	1,463,220	17,728	17,776
August	2,523,921	1,280,526	20,909	12,482
September	2,276,770	1,168,915	21,181	14,393
October	2,164,768	1,173,283	24,480	14,739
November	1,867,107	1,103,472	18,619	14,705
11 months	29,733,415	17,294,789	260,242	196,383
December	1,665,690	.....	16,288	.....
Year	31,399,105	.....	276,530	.....

*These totals do not include charcoal pig iron. The 1930 production of this iron was 96,580 gross tons
†Included in pig iron figures.

Daily Average Production of Coke Pig Iron

Gross Tons

	1929	1930	1931
January	111,044	91,209	55,299
February	114,507	101,390	60,950
March	119,822	104,715	65,556
April	122,087	106,062	67,317
May	125,745	104,283	64,325
June	123,508	97,804	54,621
½ year	119,564	100,891	61,356
July	122,100	85,146	47,201
August	121,151	81,417	41,308
September	116,585	75,890	38,964
October	115,745	69,831	37,848
November	106,047	62,237	36,782
December	91,513	53,732	.....
Year	115,851	86,025	.....

Merchant Iron Made, Daily Rate

1930	*Tons*	1931	*Tons*
Nov.	12,507	May	13,212
Dec.	12,780	June	11,209
1931		July	12,012
Jan.	9,416	Aug.	9,569
Feb.	11,332	Sept.	8,985
March	11,481	Oct.	7,051
April	13,429	Nov.	5,758

Production by Districts and Coke Furnaces in Blast

District	Production (Gross Tons) November (30 Days)	Production (Gross Tons) October (31 Days)	December 1 Number in Blast	December 1 Operating Rate, Tons a Day	November 1 Number in Blast	November 1 Operating Rate, Tons a Day
Buffalo	77,125	87,770	5	2,570	5	2,830
Other New York and Mass.	13,030	13,095	1	435	1	425
New Jersey	....	....	0	....	0	....
Pennsylvania:						
Lehigh Valley*	34,206	32,498	3	1,140	3	1,025
Schuylkill Valley	5,510	14,020	0	....	1	455
Susquehanna and Lebanon Valleys	16,961	15,448	1	565	1	500
Ferromanganese	....	....	0	....	0	....
Pittsburgh District	179,595	216,436	8	5,885	10	6,380
Ferro. and Spiegel.	4,135	4,044	1	140	1	130
Shenango Valley	9,143	7,987	1	310	0	....
Western Pennsylvania	20,252	18,402	1	680	1	595
Ferro. and Spiegel.	6,256	6,185	1	215	1	200
Maryland	61,752	48,953	3	2,175	2	1,580
Wheeling District	103,073	107,531	3	3,435	3	3,470
Ohio:						
Mahoning Valley	103,795	97,188	7	3,380	7	3,130
Central and Northern	105,529	111,253	7	3,405	8	3,590
Southern	22,546	26,116	1	360	2	800
Illinois and Indiana	212,556	217,661	11	6,860	11	6,895
Mich., Wis. and Minn.	23,617	24,604	2	785	2	750
Colo., Mo. and Utah	9,008	19,486	1	300	1	310
Virginia	....	....	0	....	0	....
Kentucky	8,727	14,324	1	290	1	460
Alabama	86,408	95,282	6	2,880	7	3,075
Ferromanganese	....	....	0	....	0	....
Tennessee	....	....	0	....	0	....
Total	1,103,472	1,173,283	67	35,810	70	36,530

*Includes spiegeleisen.

W. W. MACON
Editor

..THE IRON AGE..

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Now for the New Year

EXPECTATIONS of two months or so ago that there would be a substantial increase in steel demand were disappointed, but a reassuring influence came later in that November ran better than October, failing to show the seasonal decline that has so often occurred at that time, while there is now prospect of no more than a very mild decrease this month. There will be effort on the part of consumers all down the line to reduce stocks, but there are scarcely any stocks left on which such effort can be exerted.

The steel trade is now looking to the new year, and December production is of interest chiefly as the basis from which improvements will be computed. The experience of the last two years should furnish some sort of suggestion, and that is an unusually large percentage increase to the spring peak. In ordinary times December has regularly been the low of the late months of a year and March, or occasionally April, the high month of the whole year. December to March increases have generally run 10 to 25 per cent in what may for convenience be called "regular" times.

The last two years have been quite different. Recession in general business activity began at the middle of 1929 and by the beginning of December there was a disposition everywhere to curtail, December production being so low that the subsequent peak rate, in February, was 46 per cent higher. Then there was a continued decline, with a slight interruption in August, to a still lower December and last March ran 51 per cent above that December. It is unsafe to generalize, but the indication was that poor times pull December down more than they pull the spring peak down, hence a greater percentage rise.

In substantially all directions steel demand has been thoroughly shaken out. The virtual absence of railroad buying has already been fully reflected in steel production, and so with almost any other line that might be mentioned, with the possible exception of fabricated structural steel. Order books in that line are rather light and in the past, on an average, January has been the low month for fabricated structural steel shipments.

The automobile outlook is particularly promising, relatively speaking, by reason of the thorough liquidation that has lately occurred. Dealers have been allowed to reduce their stocks to the lowest point in years and new models have been held back. October production, just officially reported at 81,582 cars and trucks, United States and Canada, was the lowest for any month since 1921. That was a reflection of liquidation, not of current economic conditions, for such conditions also affected to a great extent production in preceding months. The automobile industry is now set to do relatively well for several months. Its first-quarter production is virtually certain to show an unusual increase over the quarter now ending.

Relatively speaking the rail outlook is promising, as to first-quarter gain, since the usual anticipatory rolling late this year has not occurred. It is difficult to see why there should not be a fair volume of rail replacements next year, when the cost comes chiefly from depreciation accounts and it is earnings rather than cash that make the present railroad trouble.

Business Preparedness

A CONTRACTOR in a New England city of 200,000 people needed 1000 lb. of putty. All the sources of local supply combined could furnish only 300 lb. His construction job was delayed until putty could be obtained elsewhere.

This example is cited to show the extraordinary low levels to which inventories have been driven by the depression. The first signs of business improvement will stimulate a replenishing of supplies to bring them into line with normal requirements. The volume of replenishment buying in the aggregate will be large and will bring profit to those manufacturers who are prepared to supply the goods. Those production managers who are taking advantage of slow times to cull out inefficient methods and outmoded equipment will have their plants in ship shape when the turn comes. They realize the futility of forecasting the time of recovery, but they believe in preparedness.

DEVELOPMENT of new products and broadening markets for established ones are bound to be the order of the day. The Industrial Marketing Conference held by the American Management Association in Cleveland recently rightly focussed on the subject, and with profit. The opinions of this meeting might well be summed up by saying that a manufacturer by a thorough survey of a market should discover if a proposed new product would likely develop sufficient demand to make its production a profitable undertaking. He should sell and then build, reversing the more common practice of making something first and then striving to find the market.

Christmas Gifts to Buyers

Much of the high cost of doing business in flush times is due to extravagant entertaining of customers, Christmas gifts and other such methods of cultivating good will. The Canadian National Railways' purchasing and stores department has taken an interesting and commendable step in writing to all purveyors from which it buys requesting them to omit Christmas gifts to the railroad's buyers.

"We realize that heretofore these gifts have been accompanied entirely by the best of good will and personal regard," says the railroad company's letter, "but we believe it to be to the interest of all concerned at the present time to have the practice of making gifts to purchasers of railroad material discontinued. These are times when we feel that costs of manufacture and selling prices should be kept down to the minimum. We realize that the price of these gifts must eventually go into the cost of production, and therefore passed along to the purchaser for payment."

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By-Product Coke Accumulates

MANY manufacturing operations can be discontinued at will, but not so by-product coke manufacture. Ovens can be gaited down to a very material extent, while beyond that they must be put out of operation and artificially heated, at a very considerable expense, the final recourse of allowing them to grow cold being rebuilding, naturally very expensive.

Until recently there was little thought that a very serious problem would confront by-product operators, but the very small blast furnace requirements of late have made difficulties. Last month's pig iron production was a shade under 33 per cent of the average rate in 1929, while production at "furnace" by-product coke plants was nearly 41 per cent of the 1929 average. Just how this slowing down was accomplished is not known, particularly how much was accomplished by closing ovens and heating them artificially.

Some of the "furnace" by-product producers have been pushing sales to outsiders as never before, even in instances installing crushing machinery to prepare domestic sizes of coke as supplementary to their sales of screenings produced in regular course—coke larger than breeze and smaller than should go into a blast furnace.

That the recourses have not been entirely adequate is shown by the rise in stocks of coke. Practically throughout 1930 stocks at "furnace" plants increased, from 1,070,114 tons Jan. 1, 1930, to 1,454,950 tons Jan. 1, 1931. At no time during the domestic heating season did the stocks decrease except last February and then the decrease was small, not offsetting the increase of the preceding month. There have been monthly increases since then, to 1,757,445 tons on Nov. 1.

By no means did the other by-product plants, those doing a merchant business, fare any better, their stocks increasing during 1930 from 1,145,095 tons to 1,799,338 tons. There was a decrease to 1,336,845 tons on March 1, but continuous increases thereafter to 2,456,850 tons Nov. 1. Total stocks at "furnace" and other plants Nov. 1 were 4,214,295 tons, 1.77 times the October production.

Coupled with the difficulty in disposing of coke that is not made voluntarily is failure of the markets to absorb by-products at prices that would cover cost, and of course naturally enough. These are bad times all around and about the most awkward thing of all to manage is a by-product plant. These plants have been of inestimable service in the past and the present inconvenience, while impressive, is a small item relative to past service or the service that is going to be rendered in future when times are not so bad.

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A Tariff for Bargaining Purposes

WITH characteristic thoroughness Great Britain is now imposing a 50 per cent tariff duty on a succession of commodities. The president of the Board of Trade is simply making his selections from time to time from among manufactured and semi-manufactured goods, excluding foods, the imposition being for an "experimental" period of six months, British dominions excluded.

The proceeding may seem rough in the light of our practice of extensive "hearings"—apparently with little listening, however—and subsequent log rolling, but it is to the point for there is an emergency and the spirit is distinctly British. It seems like a big departure but in the light of English history it is not, for British free trade as the last three American generations have known it was adopted only in a period 70 to 90 years ago, when protective duties were successively removed. British tariffs began in the fore part of the fourteenth century, while in the next century importation of various things was prohibited entirely.

The present 50 per cent duties are in general prohibitive but will allow articles to come in when for special reasons a fancy price can be afforded. Apart from the duty, there is with gold countries a burden on importations equal to the fall in the pound sterling. A month ago the pound was off 20 to 25 per cent and with the declining tendency shown last week it may be set roughly at between 25 and 30 per cent off. At 27½ per cent the cost of exchange on the United States is up 38 per cent. It is curious that some American protectionists have ventured to suggest that our exports to Great Britain will not be greatly impaired. Parliament thought it knew what it was doing and if it does not achieve its purpose it will have missed its guess. Presumably there would then be further action. It was declared that the object was not to raise revenue.

The duties are prescribed to come off automatically at the end of six months if nothing is done meanwhile, but it should not be difficult to foresee that something will be done, for the tendency will be for the duties to become less forceful as prices of domestic goods advance, not to speak of possible declines in other countries whose exports to Great Britain will be curtailed. Moreover, the country

cannot be expected to become so well off in six months as no longer to need the duties.

The British are commercial and know how to bargain. These tariffs will be reduced when bargains can be made, presumably advantageous to both parties. If every country had an equal tariff there would be no advantage in a tariff except that of raising revenue.

The real and important question for the future is not whether there shall be bargaining but how it shall be conducted, whether in a manner between individual countries to arouse animosities elsewhere, or through a round table conference of many nations. That would require a great deal of broad-minded statesmanship, but it is necessary.

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Why Pay a Punctuality Bonus?

To the Editor:—Answering A. H. Rodrick's question in the Nov. 19 issue of THE IRON AGE, a punctuality bonus is paid just because of that human equation to which he refers.

Theoretically, when a man enters employment he contracts to render all the service possible and accept the wage agreed upon. Actually, however, the employer knows that this is not being done and sets up a piece-work rate or a bonus system. The immediate response of the employee to this incentive proves the employer to be right and shows that the employee made a mental reservation when entering upon the implied contract.

The foreman is expected to produce so much in return for being equipped with proper space and efficient machines. He is handicapped by the man who will not give the full number of minutes in the working day and by the man who will not produce all that the machines are capable of turning out. As the capacity of a machine is almost a known quantity these days, why not exact a penalty from the man who fails to meet the figure? Would not this be analogous to penalizing a man for being tardy?

Where the writer has been in contact with a bonus for punctuality it has not been possible for the employee to yield to the temptation for a little more sleep and escape the consequences. All wages were paid on the clock record, so that tardiness meant a shrinkage in the pay envelope. In other words, there was in simultaneous operation a bonus for punctuality and a penalty for tardiness.

However, just because of two classes of excusable tardiness cited by Mr. Rodrick—unavoidable and authorized—it is unfair to deduct one hour's pay irrespective of the extent of the tardiness. The manufacturer referred to by Mr. Rodrick as imposing such a penalty may have thought himself smart because in many cases he obtained up to 45 min. of work from an employee for nothing, but he might be surprised to learn how much activity the man could exhibit and how little production he could turn out during those minutes.

H. D. MURPHY.

Bloomfield, N. J.

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Bookings of Malleable Castings Increase

WASHINGTON, Dec. 1.—Making a gain of 535 tons, October bookings of malleable castings totaled 18,145 tons as against 17,610 tons in September, according to reports made to the Bureau of the Census by 115 establishments. Production rose to 20,123 tons from 18,193 tons, and shipments declined to 17,481 tons from 18,387 tons.

Orders in the first 10 months of 1931 totaled 259,812 tons as against 421,941 tons in the corresponding period of last year; the output was 268,217 tons as compared with 457,458 tons, and shipments were 283,136 tons as against 466,353 tons.

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Orders for Steel Castings Show Slight Decline

WASHINGTON, Dec. 1.—Registering a slight decline of 222 tons, orders for commercial steel castings in October were 22,851 tons or 15.7 per cent of the capacity of the 131 establishments reporting to the Bureau of the Census as against 23,073 tons or 15.8 per cent of capacity in September. The bookings consisted of 6961 tons of railroad specialties and 15,890 tons of miscellaneous castings. Orders in the first ten months of the year totaled 352,792 tons as compared with 786,923 tons in the corresponding period of last year.

Production in October was 24,083 tons, a drop of 2865 tons from September. The October output consisted of 7366 tons of railroad specialties and 16,717 tons of miscellaneous castings. In the first 10 months of the current year the production was 392,019 tons as against 901,292 tons in the corresponding period of 1930.

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Canadian Iron and Steel Output Lower in October

TORONTO, Nov. 24.—Owing to the fact that only one blast furnace was blowing in Canada in October, and, since the Statistics Act states that the operations of individual concerns may not be divulged, no actual figures on pig iron production are available for the month. It is stated, however, that the furnace in blast at Hamilton, Ont., has a rated capacity of 500 tons per day and was in continuous operation throughout the month, which would indicate an output of approximately 15,000 tons. At present, however, two stacks are in. The Algoma Steel Corpn., blew in its No. 1 furnace on Nov. 16.

Output of ferroalloys for the month totaled 1912 tons, which compares with 5700 tons in September and 5174 tons in October, 1930. The aggregate output for the 10 months was 42,006 tons, compared with 59,877 tons a year ago.

Production of steel ingots and direct steel castings in October totaled 30,926 tons, slightly under the 33,390 tons for September and comparing with 65,431 tons in October last year. For the 10 months ended with October, the production of steel ingots and direct steel castings amounted to 623,781 tons, against 883,902 tons for the corresponding period of 1930 and 1,203,625 tons in 1929.

Quotations for pig iron were the same as in September. The Dominion Bureau of Statistics index for iron and its products rose from 86.8 in September to 87.3 in October, owing principally to advances in hot-rolled and annealed steel sheets and for steel tank plates, which influenced the index more than enough to offset reductions in galvanized wire and steel scrap.

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In the article in THE IRON AGE, Nov. 26, page 1366, entitled "How Carbon Content and Heat Treatment Can Affect Wear Resistance," the two illustrations were interchanged by mistake.

Pig Iron Output in Further Decline; Weakness in Some Steel Prices

Blast Furnace Production Off About 2.8 Per Cent From That of October—Plates, Shapes and Bars Reduced at Chicago

PIG iron production underwent a further decline in November. On a daily basis, the loss was about 2.8 per cent compared with October output, or about the same as the drop from September to October. The total for the month was 1,103,472 gross tons, or 36,782 tons a day, compared with 1,173,283 tons in the previous month. The recession in the daily figure was 1066 tons, against the October daily decline of 1076 tons.

There was a loss of three furnaces during the month, leaving 67 in blast, compared with 69 at the lowest point of the 1921 depression.

E'even months' total output is 17,294,789 tons, a reduction of almost 12,500,000 tons from that of the corresponding period in 1930.

UNDER the influence of the approaching inventory season, steel business has lost ground in some districts, but the delayed contracts of the Ford, Chevrolet and Chrysler automobile companies probably will be on mill books this week or next and will aid in offsetting the usual year-end dullness. The Ford orders, which will range from 100,000 to 300,000 tons for December and first quarter, are to be more widely distributed than usual, affording work for several steel producing districts.

Ingot production is lower at Pittsburgh, Youngstown and Cleveland, but is up slightly at Chicago, where business recently has been conspicuously poor. There are gains also at Buffalo and Birmingham because of the operation of mills that run only alternate weeks. The average for the country is 29 per cent for the second week. Steel production is maintained in part because of the desire of producers to give as much work as possible to employees prior to Christmas.

November steel output, when officially reported next week, undoubtedly will show a small gain over that of October despite the fact that the three major lines of consumption—automobiles, building and railroads—were taking much less than their normal share of the total.

PRICE declines on some products and weakness in others foreshadow a lower level for the first quarter. Plates, shapes and bars are $2 a ton off at Chicago, this change, however, merely reflecting recent price concessions that have become more widespread, a situation that is true also of structural shapes at Pittsburgh, where 1.50c. to 1.60c. a lb. is now quoted, the lower figure also being $2 a ton below formal quotations of past months.

Meanwhile, many steel companies are withholding announcements of first quarter prices, awaiting clarification of the present situation. Delays in the letting of automobile tonnage are said to be due partly to the hesitation of steel producers in giving the concessions that the automobile companies are demanding. Definite weakness has developed, however, in automobile body sheets and cold-finished sheets, resulting in shading of $2 a ton, while cold-rolled strip, fender stock and long ternes also are affected. Cold-finished steel bars are quoted $2 a ton lower at Cleveland. Owing to the tonnage involved, the Ford business is expected to bring out the weakest spots in the market.

A Cleveland mill has reaffirmed the present price on steel bars for first quarter, and there is no pronounced weakness in bars at Pittsburgh, but the effect of the Chicago reductions on other districts will be watched with interest by buyers, notwithstanding the recent tendency of Western mills to disregard to some extent the long-established differential of $2 a ton over Pittsburgh prices. Present alloy steel bar prices have been named for the first quarter. Some additional makers of hot and cold-rolled strip steel are trying to reestablish for first quarter prices that were in effect prior to recent declines, and there is talk also of advances on wire products, but the present situation is hardly favorable to such efforts.

BUILDING activity is still in a slump, being supported largely by public projects. The week's structural steel awards were only 12,500 tons, but new work totals 31,000 tons, including 13,300 tons for the West Side elevated highway, New York. Railroad buying is virtually at a standstill pending the outcome of wage discussions at Chicago. For pipe lines there is the prospect of the immediate placing of 12,000 tons by the Continental Construction Corpn. for a gas spur from Genesco, Ill., to Milwaukee, and the Ajax Pipe Lines Co. contemplates building an oil line from Glenpool, Okla., to Wood River, Ill.

Pig iron business shows no marked tendency toward expansion, although some business is being placed for first quarter. At Chicago, foundry iron has been affected by sales of Cleveland iron brought in by boat, but prices have not been formally reduced. Charcoal iron, however, is $2 a ton lower. Offerings of spiegeleisen are made to large buyers at $1 a ton below recent minimum quotations.

EXPORTS of iron and steel in October, at 59,335 tons, were the smallest since January, 1905, despite the largest movement of scrap since last April. Imports were the lowest, except for last February, since January, 1924. In 10 months exports declined 52 per cent from those of the corresponding period in 1930 and imports were 21 per cent lower.

THE IRON AGE composite price on finished steel has declined to 2.102c. a lb. after holding for 19 weeks at 2.116c., and this average does not take into account the decline of $2 a ton on plates, shapes and bars at Chicago. Pig iron remains at $14.96 a gross ton and steel scrap at $8.75.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron,

Per Gross Ton:	Dec. 1, 1931	Nov. 24, 1931	Nov. 2, 1931	Dec. 2, 1930
No. 2 fdy., Philadelphia	$15.51	$15.51	$15.76	$17.76
No. 2, Valley furnace	16.00	16.00	16.00	17.00
No. 2 Southern, Cincinnati	14.69	14.69	14.69	14.69
No. 2, Birmingham	12.00	12.00	12.00	14.00
No. 2 foundry, Chicago*	17.00	17.00	17.00	17.50
Basic, del'd eastern Pa.	16.25	16.25	16.75	17.75
Basic, Valley furnace	15.00	15.00	15.00	17.00
Valley Bessemer, del'd P'gh	18.26	18.26	18.26	19.26
Ma'leable, Chicago*	17.00	17.00	17.00	17.50
Malleable, Valley	16.50	16.50	16.50	17.50
L. S. charcoal, Chicago	*23.04*	25.04	25.04	27.04
Ferromanganese, scab'd carlots	‡85.00	‡85.00	‡85.00	94.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

‡Ferromanganese quotations adjusted to carload unit; larger quantities at discount.

Rails, Billets, etc.,

Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh	29.00	29.00	29.00	31.00
Sheet bars, Pittsburgh	29.00	29.00	29.00	31.00
Slabs, Pittsburgh	29.00	29.00	29.00	31.00
Forging billets, Pittsburgh	35.00	35.00	35.00	36.00
Wire rods, Pittsburgh	35.00	35.00	35.00	36.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.60
Bars, Chicago	*1.60*	1.70	1.70	1.70
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.93	1.93	1.93	1.93
Tank plates, Pittsburgh	1.60	1.60	1.60	1.60
Tank plates, Chicago	*1.60*	1.70	1.70	1.70
Tank plates, New York	*1.83*	1.88	1.88	1.88
Structural shapes, Pittsburgh	*1.50*	1.60	1.60	1.60
Structural shapes, Chicago	*1.60*	1.70	1.70	1.70
Structural shapes, New York	1.85½	1.85½	1.85½	1.85½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.00
Hot-rolled strips, Pittsburgh	1.50	1.50	1.50	1.55
Cold-rolled strips, Pittsburgh	2.05	2.05	2.05	2.25

Finished Steel,

Per Lb. to Large Buyers:	Dec. 1, 1931 Cents	Nov. 24, 1931 Cents	Nov. 2, 1931 Cents	Dec. 2, 1930 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.35
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.50	2.50	2.50	2.45
Sheets, galv., No. 24, P'gh	2.90	2.90	2.90	2.95
Sheets, galv., No. 24, Chicago dist. mill	3.00	3.00	3.00	3.10
Hot-rolled sheets, No. 10, P'gh	1.70	1.70	1.70	....
Hot-rolled sheets, No. 10, Chicago dist. mill	1.80	1.80	1.80	....
Wire nails, Pittsburgh	1.90	1.90	1.90	1.90
Wire nails, Chicago dist. mill	1.95	1.95	1.95	1.95
Plain wire, Pittsburgh	2.20	2.20	2.20	2.30
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.35
Barbed wire, galv., Pittsburgh	2.55	2.55	2.55	2.60
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	2.75
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material,

Per Gross Ton:				
Heavy melting steel, P'gh	$10.25	$10.25	$10.12½	$12.75
Heavy melting steel, Phila.	8.00	8.00	8.00	11.50
Heavy melting steel, Chicago	8.00	8.00	8.00	10.00
Carwheels, Chicago	8.50	8.50	9.00	11.75
Carwheels, Philadelphia	11.50	11.50	11.50	14.00
No. 1 cast, Pittsburgh	10.00	10.00	10.00	12.50
No. 1 cast, Philadelphia	10.50	10.50	10.50	12.00
No. 1 cast, Chicago (net ton)	8.50	8.50	8.50	9.50
No. 1 RR. wrot., Phila.	9.50	9.50	9.50	13.50
No. 1 RR. wrot., Ch'go (net)	6.50	6.50	6.50	8.50

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt	$2.40	$2.40	$2.40	$2.50
Foundry coke, prompt	3.50	3.50	3.50	3.50

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	6.87½	6.87½	7.37½	12.12½
Electrolytic copper, refinery	**6.50**	6.25	6.75	11.25
Tin (Straits), New York	*21.00*	23.12½	22.25	25.87½
Zinc, East St. Louis	3.12½	3.12½	3.15	4.07½
Zinc, New York	3.47½	3.47½	3.50	4.42½
Lead, St. Louis	3.65	3.65	3.80	4.95
Lead, New York	3.85	3.85	4.00	5.10
Antimony (Asiatic), N. Y.	*6.50*	6.62½	6.50	7.10

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Dec. 1, 1931	2.102c. a Lb.	$14.96 a Gross Ton	$8.75 a Gross Ton
One week ago	2.116c.	14.96	8.71
One month ago	2.116c.	15.00	8.75
One year ago	2.135c.	16.02	11.42
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1931	2.142c., Jan. 13	2.102c., June 2	$15.90, Jan. 6	$14.96, Nov. 10	$11.33, Jan. 6	$8.71, Oct. 27
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

Pittsburgh Steel Business Declines Moderately; Some Prices Weak

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PITTSBURGH, Dec. 1.—Interrupted by the Thanksgiving holiday, last week was a rather poor one for Pittsburgh district steel companies, and the last two days have also been quiet. Specifications from the automobile companies are still disappointing, the large Detroit buyers not having closed against their recent inquiries for first quarter. However, this may be attributed partly to the steel companies, which are in no hurry about establishing first quarter prices.

Railroad buying is still delayed, pending the meeting of the labor union executives in Chicago next week. The requirements of the building industry are still confined largely to public works, but the volume of inquiry for both structural steel and reinforcing bars is comparatively good for this time of the year. Miscellaneous buying of steel products is beginning to reflect the approach of inventory-taking time and seems to be more restricted than it was a month ago.

Ingot production in the Pittsburgh district is still tending downward, and the rate this week is not above 27 per cent. The leading interest is still running at about 30 per cent, at least five points above the average of the smaller independent companies. Valley open-hearth activity has declined to 30 per cent of capacity and will probably drop further before the end of the week. Production in the Wheeling district is unchanged.

Finishing mill schedules this week are about the same as last, with the exception of tin plate, which has been boosted to about 50 per cent by the higher schedules of a single producer. Sheet production is maintained, but strips are less active.

More attention is being given to the price structure, but the character of current buying is not conducive to the establishment of new levels. Pressure is most pronounced in the case of sheets, notably the automobile body grade, but makers have been able to postpone commitments for first quarter, and the market has not yet been defined. On the other grades, no changes are expected, while strip quotations established a month ago seem likely to extend into the new year despite efforts to make advances. Buying of the heavy products is too meager to establish clearly defined prices. On structural shapes, a price of 1.50c., Pittsburgh, has become more common, but this figure has been in evidence for some time, as well as even lower quotations on attractive

Pittsburgh and Valley steel ingot production off slightly, but Wheeling district rate is maintained.

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Expected large buying by automobile companies delayed and other purchases are light.

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Structural shapes on 1.50c. to 1.60c. base, the lower price reflecting recent tendency to make concessions on larger lots. Bars and plates unchanged.

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Steel scrap fairly strong, more on scarcity than on buying by mills.

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tonnage. Reinforcing bar prices also lack strength, but merchant bars are well maintained in this district and there is not enough plate tonnage in the market to warrant concessions. Nails and wire products are probably the strongest in the list, and talk of first quarter advances persists.

Pig Iron

This market continues very dull. The blowing in of a merchant stack in the Valleys does not signify any change in demand. The furnace will merely supply the need of a nearby mold plant and build up depleted stocks. No inquiry for first quarter is appearing, and current sales are scattered and small. Shipments were particularly light last week. Foundry operations during December may be curtailed even further. The price situation is unchanged.

Semi-Finished Steel

Movement of sheet bars to certain non-integrated tin plate makers will show some improvement this month over November. No test of the price is offered, with $29, Pittsburgh, still quoted currently on billets, slabs and sheet bars. Forging billets are holding at $35. While this figure still represents the current market on wire rods, there is some prospect of an advance for first quarter.

Rails and Track Accessories

This market is at a standstill, pending the meeting of the railroad brotherhoods in Chicago next week to discuss wage revision. The local rail mill is still running at about 30 per cent of capacity, but is maintained chiefly by other steel products which can be made on the mill. Inquiry for rails and accessories is almost entirely lacking, and rolling schedules are very light.

Bolts, Nuts and Rivets

No change in the rate of demand is reported, although prospect of heavier movement to the automobile industry is in sight this month. Prices are somewhat more uniform, with makers quoting 70, 10 and 10 per cent off list on bolts to principal buyers. Large rivets are unchanged at $2.25, Pittsburgh.

Warehouse Business

The warehouse market is very quiet. Price changes on the heavier steel products are lacking, although bolts are lower, with most distributers quoting 70 and 10 per cent off list. On the other hand, wire nails are stronger, with $2.25 a keg being quoted by most jobbers.

Bars, Plates and Shapes

Although a fair amount of inquiry for structural steel and reinforcing bars is coming out from time to time, the market is still comparatively quiet, and most of the smaller fabricated shops in the district are engaged at a low rate. New inquiry is confined almost entirely to bridges and other public works. The low prices which have come out on highway and other road building jobs have enabled many States to broaden their programs, as quotations in most cases have been far under engineers' estimates. The only large structural job before the trade in the Pittsburgh district is the Post Office, on which bids are to be taken Dec. 15. Automobile purchases of bars are still light, and shipments show no material increase. Demand for merchant bars from other sources is light but fairly well sustained.

Plates are quiet, although the Chesapeake & Ohio is reported to have closed on approximately 4000 tons for car repairs. Barge business in prospect early in the new year is rather heavy, but current awards are light. The Mississippi Valley Barge Line has not yet closed against its recent inquiry.

Prices show no important changes, except possibly a wider extension of

lower quotations on structural shapes. Some small buyers who formerly were paying 1.60c., Pittsburgh, are now able to buy at 1.50c., and sharp concessions on heavy tonnages are still in evidence. Plates are holding somewhat better, with current small orders generally bringing 1.60c., Pittsburgh. Prices on bars are even better maintained, softness being confined almost entirely to reinforcing bars.

Cold Finished Steel Bars

No change is reported in the rate of specifications, and the Thanksgiving holiday broke the week to the detriment of most mills. Prices in this district are generally unchanged, with 2.10c., Pittsburgh, holding on current small lots. Large buyers are naturally enjoying a slight differential in some cases, but the number of preferential customers has not increased in recent weeks.

Tubular Goods

The Continental Construction Corpn., Chicago, has not yet closed against its recent inquiry for 170 miles of 20-in. pipe, and it is now reported that only half of this business will be placed this year. No other new projects which are likely to be placed in the near future are before the trade, although many lines are in prospect that will likely result in orders next spring. Demand for other lines of tubular goods has not changed much in the last week. Mechanical tubing is somewhat more active than it was last month, but oil country goods are even more quiet, and standard pipe has failed to show any additional activity. Movement of boiler tubes is well sustained, even though the average rate is low. The pipe industry as a whole is not engaged at more than 25 per cent of capacity.

Wire Products

With movement of merchant wire products to jobbers slowing up as inventory-taking time approaches, the market promises to be quieter than it was last month. Talk of a price advance is heard, and this may stimulate some additional specifications during December. However, most buyers are willing to take a chance on a higher price rather than increase their stocks unduly. Manufacturers' wire is going to the automobile trade at a better rate, but the change is not significant as yet. Current quotations are well maintained.

Sheets

Releases last week were sufficient to sustain operations in the industry, with slight gains reported by some makers. Potential capacity is still engaged at about 30 per cent. A slight improvement in demand for electrical sheets is reported, and tack plate is a little more active. Otherwise the major consuming industries are doing little, and tonnage from the automobile manufacturers is still disappointing.

Manufacturers have delayed quoting on recent automobile inquiries as long as possible, and no official announcement regarding first quarter prices has been made. While something may be said this week, it is not likely that any change will be forthcoming unless a decline is forced on producers. This is unlikely, except possibly on auto body sheets. As yet the price on this grade for the first quarter is not clearly defined.

Tin Plate

One large maker in the district has stepped up its production to a near capacity rate, and will give as much employment as possible to its workmen during December. Tonnage to be rolled is largely for anticipated delivery. Production by other makers is holding its own, and the industry as a whole is now engaged at nearer to 50 per cent than to 45 per cent, which has prevailed in recent weeks. First half contracting is proceeding more rapidly, but is still delayed to some extent by credit conditions in the canning industry.

Strip Steel

The rate of incoming specifications was checked somewhat last week, but largely on account of the holiday. Production was fairly well maintained, but schedules this week are lower, with the industry running at not more than 25 per cent. No announcement regarding first quarter prices has been made, and one or two mills have extended present quotations in a few cases. Under these circumstances, the possibility of advancing prices to the level which prevailed until about a month ago is more remote. Current selling prices range from 1.50c. to 1.55c., and 1.60c. to 1.65c., on hot-rolled strip, and 2.05c. to 2.15c. on cold-rolled.

Coke and Coal

Colder weather has stimulated demand for heating coke in the last week, but the furnace and foundry grades are still very quiet. Blowing in of a merchant blast furnace in the Valleys will provide an outlet for additional furnace coke, but this has already been offset by reduced production elsewhere. Demand for coal shows little change, except a slight improvement in the domestic grades.

Old Material

The scrap market is stronger in the opinion of some dealers, but strength is based upon the scarcity of offerings rather than any disposition of buyers to pay higher figures. The only sales reported are small lots of No. 1 heavy melting steel at $10.25. The Pennsylvania Railroad list, to be sold this week, will certainly bring $10.50 or more, and the market range is unchanged. Dealers are having difficulty buying against old orders at less than $10, and are operating on narrow profit margins. Ten dollars is also being offered for hydraulic to cover old orders at at least three mills, and, with the last sale into consumption having been made at the same figure, a flat $10 price continues to represent the market. The other grades of scrap are very quiet, and no sales have been made to change quotations. The Baltimore & Ohio list this month contains only 2900 tons.

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Valley Steel Production Off Slightly This Week; One Blast Furnace Banked But Another Goes On

YOUNGSTOWN, Dec. 1.—Nine of 32 blast furnaces in the Youngstown district are in blast this week, the loss of one stack being offset by the resumption of another. The blast furnace at Sharpsville, Pa., of the Shenango Furnace Co., is scheduled for resumption, while the stack at Lowellville, in Ohio, of the Sharon Steel Hoop Co., Sharon, Pa., has been banked owing to ample stocks of cold iron.

For the first week in December, the Valley steel industry is averaging 30 per cent, with indications that this rate of production will be supported in spite of the fact that December is usually a slow month. November production and shipments registered a gain over October, the first monthly increase since spring.

A curtailment in the activity of flat steel departments is offset by the resumption of pipe mills. A number of mills were started this week by the Sheet & Tube company, whose tubular capacity was entirely inactive the week before. Schedules show two electric welding mills in operation, one seamless mill, four buttweld and two lapweld units.

New sheet tonnages are being received in irregular volume, accounting for some fluctuations from week to week in operating schedules. Less than 30 of the Valley's sheet finishing capacity was scheduled at the beginning of the week, with others to get under way. Strip capacity is active at 30 per cent. At Warren, the Republic company is again operating all of its 24 tin mills.

Steel ingot output is down moderately, as compared with preceding weeks, but rolling mill schedules are holding their own.

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Surface Combustion Corpn., Toledo, Ohio, recently received an order for three continuous gas-fired walking beam pack heating furnaces for the Tennessee Coal & Iron Co., Fairfield, Ala.

Plates, Shapes and Bars Are $2 a Ton Lower in Chicago District

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CHICAGO, Dec. 1—Foremost among developments in this market are reductions of $2 a ton on the more attractive tonnages of plates, shapes and bars. Sheet producers are extending present quotations for delivery in the first quarter, and wire sellers, though having expected to announce price policies prior to this time, are still somewhat in doubt as to the course to be taken.

Prices for Northern iron wavered in the past week under pressure of boat movement from Cleveland. However, the navigation season is near the end and, if the market can weather the next week or 10 days, it may again gain stability at current quotations.

Although it had been thought by some that low inventories and a slight improvement in business in a few directions would tend to level off the downward swing in steel demand usually experienced at this time of year, it is now quite apparent that pressure from these causes is at hand. It is as yet expressed more by the attitude of consumers than in tangible shrinkage of specifications in the aggregate.

Broadening use by the automobile industry and in some instances by farm equipment builders, as well as releases of rails by the Santa Fe, give an indicated rise of one to two points in ingot production. The average for the district is now between 23 and 24 per cent of capacity.

Looking to the brighter side of current developments there is prospect that the Continental Construction Corpn. will within the next 10 days purchase about 12,000 tons of gas line pipe for the first link of its spur from Geneseo, Ill., to Milwaukee.

Warehouses find that, after taking into consideration the Thanksgiving holiday, total volume of orders is only slightly less than in the previous week. The change is far less abrupt than is usually encountered at this time of year.

Frequent concessions have brought a definitely lower price level on plates, shapes and bars, which are off $2 a ton on attractive lots.

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Sheet producers have announced present prices for first quarter contracts. No action on wire prices.

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Chicago foundry iron wavers in price because of competition of boat iron from Cleveland.

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Business generally dull, though ingot operating rate has risen slightly.

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Pig Iron

The Northern iron market is still somewhat shaken by recent sales of Cleveland iron, but, with the end of navigation in sight, there is a chance that prices will again firm at $17 a ton, local furnaces. New buying continues on a moderate scale, but specifications are lighter and point to a lower melt in December. A 3500-ton cargo of Cleveland iron has arrived at Milwaukee, where dock storage charges have been waived. Reports from Milwaukee indicate that a number of melters there are distinctly encouraged as to the outlook. Southern iron is holding at $11 a ton, Birmingham, but the movement in this direction is light. With only one charcoal iron furnace in blast, prices are off $2 a ton on the contract basis. Delivered quotations range from $23.04 to $25.04. The silvery market is dull, with few small tonnages moving from local docks.

Ferroalloys

Spiegeleisen is being offered here at $27 to $30 a ton, furnace, depending on the character of the business. It is reported that first quarter prices on other ferroalloys will be announced within the next 10 days.

Bolts, Nuts and Rivets

This market remains dull. Virtually no effort is being made to place contracts for first quarter before consumers. November made a very poor showing.

Wire Products

Announcements of first quarter prices that had been rather generally expected by this time are still not in evidence. Some sellers seem not to be anxious for this move for the reason that there is practically no consumer interest in future requirements. From the viewpoint of production, December promises to stand well among the last six months of the year. Mill stocks have been unusually low, and there is a disposition to enlarge them in anticipation of a better demand in the spring. Also, there is the urge to give some additional employment before Christmas. Shipments are lighter, especially to the North and the Northwest, where winter has already set in. Demand for copper wire remains dull, new low prices for copper having given no impetus to this market.

Cast Iron Pipe

Outstanding among fresh inquiries is one for 1000 tons of 24-in. pipe wanted by South Milwaukee. Except for this project, the market in the immediate vicinity of Chicago is very dull. It is reported here that the United States Pipe & Foundry Co. is in line to get 1000 tons for a filtration plant at Fort Wayne, Ind. The American Cast Iron Pipe Co. has taken 450 tons of 8 and 12-in. pipe for Dearborn, Mich. Hamilton, Ohio, is taking bids on 250 tons of 12-in. pipe. It is quite noticeable that a fair number of small tonnages are the direct result of welfare labor movements. Most of these tonnages are for prompt shipment.

Reinforcing Bars

Both new business and shipments in November will top by a small margin the volume in October. In addition to this favorable turn, estimators, about one-third the normal force, are busier, though this condition is largely influenced by the 5000-ton Mississippi River job, bids on which are to be entered Dec. 18. A tonnage of this size promises keen competition. As shipments are to be spread over a year or more, the project is not attractive to all dealers. Small inquiries are more numerous.

Structural Material

Interest in this market centers in highway and waterway commission bridge projects in Illinois. These form the bulk of business up for figures in this district. A situation such as now exists results in keen competition, not alone among fabricators, but also among those who supply plain material. The result is that shapes are off $2 a ton to large buyers, quota-

tions here ranging from 1.60c. to 1.70c. a lb. Fabricators are not carrying stocks and each award is a signal for keen shopping for the steel needed.

Sheets

Western producers are extending current quotations for tonnages to be delivered in the first quarter. The full effect of this move cannot now be measured for the reason that consumer interest is extremely low, and, unless there develops an urge to buy, a real test of the price structure cannot be had. Individual orders are still small. Hot mill schedules are far from satisfactory. The current rate of output is near 25 per cent of capacity.

Rails and Track Supplies

Of outstanding interest is the news that the Santa Fe has scheduled rail deliveries for December which will afford low but rather steady output during most of the month. This market is extremely dull, with little or no prospect of revival before early next year. An inquiry from the Burlington is still in prospect. There appears to be no activity in the light rail market.

Plates

Prices in this market are off $2 a ton on attractive business. The range of quotations is 1.60c. to 1.70c. a lb., Chicago. Interest shown in the market a week ago has not carried through, and mill schedules are light and uncertain. A report from Oklahoma states that the Ajax Pipe Line Co. of New Jersey will lay a 10-in. oil line from Glenpool, Okla., to Wood River, Ill. Large diameter pipe manufacture is virtually at a standstill in this district.

Bars

Quotations on mild steel bars now range from 1.60c. to 1.70c. a lb., Chicago. Demand, though still fair in comparison with other heavy rolled products, is somewhat lighter, probably as an early reflection of the approach of the inventory period. The automobile industry is taking a little more tonnage, and farm implement and road machinery builders are maintaining steady, though low, production schedules. Iron bars are now quoted at 1.60c. to 1.70c. in a dull market. Specifications for rail steel bars are spotty and light.

Coke

The contracting movement is still under way. Prices are steady at $7.50 a ton, local ovens.

Old Material

This market is as near a standstill as at any time this year. One steel mill is still refusing shipments, but even with this situation prevailing there is little or no distress tonnage appearing on track. A cargo of borings will leave Chicago this week, and then dealers plan to accumulate tonnages on docks for boat movement next spring. It is said dealers will offer $3.50 a ton, delivered on dock. Chicago brokers have sold about 5000 tons of specialties that will be diverted to St. Louis by railroads that reach both Chicago and St. Louis. Railroads are holding scrap for higher prices, and car wrecking operations are on a lower scale. These moves are primary factors in steadying the market.

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Cincinnati District Pig Iron Consumers Are Showing Little Interest in First Quarter

CINCINNATI, Dec. 1.—Interest in first quarter pig iron requirements continues to lag. Only a few small contracts have been closed and only one melter is inquiring for his estimated future needs. This inquiry is from a central Ohio consumer for 500 tons of Northern foundry iron. The week's business, totaling about 1000 tons, was for immediate needs. Shipments on old contracts are going forward at a fair rate, following a slight increase of operations among automotive foundries. The general feeling among the trade is that no general improvement can be expected until after the holiday and inventory periods. Northern iron prices in the district continue to appear uncertain as a result of a tendency to meet competition outside of Cincinnati, although in the metropolitan area quoted schedules are being upheld.

Finished Steel

Purchases of small quantities of sheets by automotive manufacturers has sustained demand at slightly under 40 per cent of capacity output. Except for a well sustained demand from makers of electric refrigerators, other consumers are not actively in the market.

Coke

Consumers' interest in first quarter coke requirements has slackened. The only new business reported is two small contracts for by-product foundry coke for first half.

Old Material

The scrap market is sluggish, with dealers buying and selling warily. Current sales are few and small. Shipments against contracts are small.

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Alabama Pig Iron Melt Shows Year-End Decline; Demand for Steel Continues at Recent Level

BIRMINGHAM, Dec. 1.—The year-end tapering off in foundry melt has begun sooner than local furnaces expected. During the past two weeks shipments have shown a marked slowing up, with the result that the November movement did not touch that for October, and bookings also were smaller. Yard stocks of two merchant producers were increased during the month. Furnace operations consist of six active stacks, the same as during all of November. However, the operations of some of these are on slow schedules. There is not much prospect of improvement until after the first of the year. Quotations for district deliveries are firmly maintained at a $12 base.

Finished Steel

New steel tonnage and inquiries have varied little from those of the preceding two or three weeks. There are signs of a brief seasonal pick-up in wire products during the early part of December. A number of box manufacturers are in the market for their early 1932 requirements. Structural steel and reinforcing bar fabricators have booked only a few small orders during the past two weeks. Last week the Tennessee company operated six open-hearths at Fairfield. The open-hearth plant of the Gulf States Steel Co., at Alabama City, was completely down last week, but this week three furnaces are active.

Cast Iron Pipe

December has a fair volume of new tonnage in prospect. A number of lettings are pending, particularly in California, and a strong bid will be made for this business by Birmingham plants. American Cast Iron Pipe Co. has booked 300 tons from Dearborn, Mich. United States Pipe & Foundry Co. was low bidder on about 900 tons at Memphis. Other new tonnage has been in small lots, mostly carloads. Plant operations continue at about 30 per cent.

Old Material

The market is unimproved. Contract shipments are small, and there is very little buying or inquiry. Prices are unchanged.

Cleveland Mills Getting More Automobile Tonnage

Operations Down to 35 Per Cent Compared With Recent Peak of 41 Per Cent—Inquiry Is Light

CLEVELAND, Dec. 1.—Demands for steel from the motor car industry are slowly increasing as automobile manufacturers are getting under production on new models, but business from other sources remains at about the levels of the past few weeks. Orders generally are for small lots and not much new inquiry is coming out.

Interest is centered in the large tonnage of sheets and strip steel to be purchased by the Ford Motor Co. for production of its new models. Mills have submitted their quotations and this business is to be placed this week, according to late reports from Detroit.

Renewed pressure for price concessions has resulted in weakness in the Michigan territory, where there are reports of shading $2 a ton on auto body and cold-rolled sheets. Owing to the tonnage involved, the Ford business is expected to bring out the weakest spots in the market.

Probably the most encouraging feature of the market is that the volume of steel business in November showed a gain over that of October. However, doubt is expressed as to whether the recent demand will be maintained this month, as December is usually a dull period.

Steel plant operations in Cleveland, after reaching a peak of 41 per cent last month, again declined three points with the shutting down of one open-hearth furnace this week. Local plants are now running at 35 per cent of ingot capacity.

Following the recent large awards for local public work, there is now no sizable business pending in the building field, and activity in this territory in the next few weeks probably will be confined largely to State highway bridge work. While some substantial rail tonnage is in prospect in this territory, this is not expected to come out before January.

Present prices on sheets have been reaffirmed for the first quarter by additional mills, and some have announced for that delivery the prices recently prevailing on hot and cold-rolled strip. Present prices on alloy steel bars are being named for the coming quarter, and one mill has reestablished the present Cleveland price on merchant bars and on tin mill black plate. Consumers are showing no interest in first quarter contracts. Concessions have been made locally on shapes and on cold-finished steel bars, the latter now being quotable at 2c. to 2.10c., Cleveland.

Pig Iron

There was more activity during the past week than for some time. While there was no buying locally, some business developed in the northern Ohio territory. Two of the larger orders, one for 1200 tons of foundry iron and another for 1000 tons, came from manufacturers of heating equipment. Part of the buying was for early shipment and part for delivery extending into or through the first quarter. November shipments were disappointing in that they showed virtually no gain over October. The looked-for increase in shipping orders from the motor car industry last month failed to materialize. For outside shipment, the market has settled down to $15.50, Cleveland, for foundry and malleable iron. For local delivery, the $17 asking price is untested.

Bars, Plates and Shapes

An award of 2000 tons of structural steel for the Cleveland Exhibition Hall was made during the week. Little new work is pending requiring either structural shapes or reinforcing bars, and no job of any size is looked for until the Cleveland Post Office comes out early in the year. Price concessions on shapes were made on round lots placed locally for public work. For small orders, the 1.60c., Pittsburgh, price is being maintained on both shapes and plates. However, the latter has not been tested on any sizable lots. For steel bars, the 1.65c., Cleveland, price is being maintained.

Strip Steel

Additional mills have announced as their first quarter price 1.55c., Pittsburgh, for wide hot-rolled strip and 1.65c. for narrow. However, current prices for good lots are $1 a ton lower. While cold-rolled strip is quoted at 2.05c., Cleveland, for good lots, some of the mills have named 2.15c. as their first quarter price. Demand for hot-rolled material shows a moderate increase owing to releases of orders from manufacturers of automobile parts.

Sheets

While considerable inquiry has developed in the Michigan territory from the automotive industry, reports indicate that no round tonnages were placed during the week. Locally, the market is rather quiet and orders are limited mostly to car lots. Electrical sheets have become fairly active. Additional mills have announced the reestablishment of present prices of 2.40c., Pittsburgh, on hot-rolled sheets, 3.10c. on auto body, 2.90c. on galvanized, and 3.25c. for enameling sheets No. 20 gage for the first quarter. One Valley mill is naming the present 2.65c. price on tin mill black plate for the coming quarter. While prices are fairly steady in this territory, concessions of $2 a ton are reported in Detroit on auto body and light cold-rolled sheets.

Bolts, Nuts and Rivets

Makers have opened their books for bolts and nuts for the first quarter at 73, 10 and 10 per cent discount, to which the market had gradually settled, although previously there had not been a formal reduction to the new discount. Stove bolts are being quoted for the coming quarter at the recent 5 per cent price advance or at 80, 25 and 10 per cent discount. Bolt and nut business continues unsatisfactory, the November volume having been slightly below that in October. Demand for rivets in small lots has improved.

Old Material

Heavy melting steel in small quantities is now being shipped from Cleveland to the Pittsburgh district at $10 for No. 1, equivalent to $7.10, Cleveland. Valley mills are also taking small quantities of No. 1 melting steel and machine shop turnings. Some scrap continues to come to Cleveland from Detroit by water, but local mills are taking no shipment from dealers against old orders. Prices are unchanged.

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Detroit Scrap Market Has Weakened

DETROIT, Dec. 1.—Aside from sporadic purchases of small lots of scrap by the local steel plant, the market has been quiet. Dealers are less optimistic than a week ago, owing to the absence of prospective buying on the part of steel mills and to numerous suspensions of shipments on current contracts.

With lake navigation closed until spring, there has been a decline of 50c. to 75c. a ton in borings and turnings, which usually are shipped from this city by water to Buffalo and other points. Otherwise, prices are unchanged and are likely to stay at about present levels the rest of the year.

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Bookings of steel castings in October, based on reports from 62 member foundries, were 16.1 per cent of rated normal capacity, compared with 18.7 per cent in September, according to the monthly survey of the Steel Founders' Society of America, Graybar Building, New York. Production in October was at 17.8 per cent, compared with 20.6 per cent in the previous month.

Eastern Pennsylvania Quiet as Year-End Approaches

Plates, Shapes and Galvanized Sheets Subject to Concessions—Pennsylvania Railroad May Buy Pig Iron

PHILADELPHIA, Dec. 1.—The usual year-end period of inactivity appears to have begun, with both producers and consumers seeking to keep down stocks until after inventory. Steel mill operations continue at about 20 per cent of rated capacity and rolling mill schedules are rather spotty from week to week. Automobile body builders continue to buy small lots of sheets and are planning to maintain present production schedules through December. Other steel consumers, however, are less busy than formerly. While prices of hot-rolled annealed, cold-rolled sheets and bars are being generally maintained, concessions of $1 a ton on plates, $1 and $2 a ton on shapes and galvanized sheets are not uncommon.

Projects requiring substantial steel tonnages are few. A small tonnage of plates is in prospect for rebuilding about 30 locomotives in the shops of the Reading Co. A loan for construction of two railroad car transports for the Overseas Railway Co. has been granted by the Government and award of the contract to an eastern Pennsylvania shipbuilder is expected soon. The Pennsylvania Railroad, which has been taking bids on a tunnel in Baltimore, is now planning to cast the necessary iron segments in its Altoona, Pa., shops. Bids will be asked Dec. 21 on the Benjamin Franklin Memorial in Philadelphia, requiring about 3000 tons of fabricated steel.

Ferromanganese

Consumers have not yet manifested interest in 1932 requirements, and domestic sellers are delaying a price announcement for next year's contracts until British sellers have indicated some price level for their product.

Pig Iron

Eastern Pennsylvania sellers are endeavoring to stiffen the price for No. 2 foundry pig iron to a minimum of $15 a ton, furnace, but, with buying limited to lots of one or two carloads, usually for first quarter delivery, there is as yet no definite test of the market. Foreign pig iron continues to be offered, and some fair-sized sales have been made in the past month, including small tonnages of basic iron to eastern Pennsylvania steel mills. Orders for Dutch iron have been fair, but are in most cases small lots for mixture purposes. Practically all the pig iron being bought at present is for first quarter delivery, consumers not wishing to increase their inventories at the end of the year. A Baltimore stove and soil pipe maker, which inquired for 1000 tons of foundry iron, closed on a small lot and postponed buying the remainder. The Pennsylvania Railroad is planning to buy 10,000 tons of pig iron for cast iron segments in a tunnel at Baltimore, which it will fabricate in its own shops at Altoona, Pa.

Steel Bars

Buying is limited to small lots, but the price is unchanged at 1.60c., Pittsburgh, or 1.89c., Philadelphia. Billet steel reinforcing bars are quoted at 1.60c., Pittsburgh, or 1.89c., Philadelphia, but on desirable projects concessions range from $1 to $3 a ton. Two Philadelphia schools each require about 300 tons of bars—the Benjamin Franklin at Rising Sun and Cheltenham Avenues and a school at Thirty-seventh and Tasker Streets.

Shapes and Plates

Although eastern Pennsylvania sellers are still quoting 1.70c., Coatesville, Pa., or 1.78½c., Philadelphia, for plates, and 1.65c., f.o.b. nearest mill to consumer, or 1.69½c., Philadelphia, for shapes, desirable specifications commonly bring out quotations $1 a ton lower on plates and $2 a ton lower on shapes.

Sheets

Except for automobile body builders, sheet consumers are less active than in some weeks. One radio manufacturer in this district is understood to be considering closing down completely. Concessions on galvanized sheets from 2.90c., Pittsburgh, are becoming more common. Hot-rolled annealed and cold-rolled sheets are unchanged in price.

Imports

In the week ended Nov. 28, 1000 tons of pig iron arrived at this port from British India, 46 tons of structural shapes from Belgium and five tons of galvanized steel strips from England.

Old Material

Deliveries of heavy melting steel on contracts are generally being delayed by consumers. Prices, although lacking strength, are unchanged in the absence of transactions.

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Buffalo Pig Iron Demand Is at Low Point; Steel Scrap Stronger on Small Sales

BUFFALO, Dec. 1.—Sales of pig iron have been very slow. Probably not more than 2000 tons was booked during the week. Many of the foundries in the district have been idle since Thanksgiving Day. No large inquiries are in sight. Competition is keen for what business is offered in the East, and from $14.50 to $15 is being done on Buffalo iron for such shipments, although one maker is consistently quoting $16.

Finished Steel

The Lackawanna plant of Bethlehem Steel has eight open-hearths on this week; Republic Steel has three on, and Wickwire Spencer two. Seneca Iron & Steel Co. is operating at about 40 per cent. Buffalo Bolt Co. is around 25 to 30 per cent.

A State bridge at Albany, requiring 1800 tons of reinforcing bars, has been let to a local fabricator. Fabricated structural contracts are for small tonnages only.

Old Material

Further sales of No. 1 heavy melting steel have been made, strengthening the present $8.50 quotation. At least one lot of 500 tons was sold at this price, and a volume of smaller lots brought total sales up to 2000 or 3000 tons. Shipments of scrap into the yards of the principal consumer, which were suspended until Nov. 27, are now being accepted.

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Canadian Business Shows Some Improvement

TORONTO, Dec. 1.—Business in the Canadian iron and steel markets continues to show some improvement, which is reflected in an upward trend in sales of merchant pig iron and some other raw materials. No large contracts have been closed, however, and melters are depending entirely on spot orders to take care of requirements. Iron sales for the week were between 500 and 600 tons, most of which was in 50 to 100-ton lots. Pig iron prices are unchanged.

Old Material

New business is gradually appearing in this market, although consumers are not yet buying in large quantities. Sales are largely of iron scrap, with machinery cast holding first place. This grade is somewhat scarce. Steel scrap is sluggish. Prices are unchanged.

New York District Sees Some Weakness in Steel Prices

Structural Shapes and Plates Easier—Ordinary Grades of Sheets Firm—Pig Iron Sales Are Fair

NEW YORK, Dec. 1.—Although only a few steel companies have named prices for first quarter and only a few consumers have asked for quotations, there is a feeling of apprehension that the recent price structure may not hold on all products. Published quotations on structural shapes and plates have for some weeks been subject to concessions on the larger tonnages, a condition which is reflected in a range on shapes of 1.50c. to 1.60c., Pittsburgh, while plates may now be quoted at 1.65c. to 1.70c., Coatesville, quite a number of sales having been made at the lower figure.

In view of the apathy of consumers toward first quarter contracting, it is not likely that steel mills will be in a hurry to name first quarter prices, especially as pending automobile tonnage in Detroit may strongly influence the trend. Prices are generally firm on sheets, except for those grades used principally by the automobile industry.

An interesting inquiry comes from the Standard Oil Co. of New Jerseey, which asks for prices for plates and shapes for its Canadian shops for the first half or all of 1932. It is not considered likely that many mills will want to quote beyond the first quarter.

Pig Iron

Although open inquiry for pig iron has been practically absent in the past week, some quiet buying has been transacted. Several sellers report comparatively fair volume of sales, with the total for the district amounting to about 4500 tons, compared with 3500 tons the week before. Little new business for first quarter has been placed, however, and with inventory taking and holiday shutdowns to be generally in effect toward the latter part of the month, general interest in forward commitments is not expected to crystallize until after the close of the year.

A cargo of Royal Dutch iron, a part of which is already sold, is expected to arrive at a New England port some time this month.

Prices on normal lots are unchanged. Competition for sizable tonnages, however, is keen, and in some instances furnace schedules have been shaded 25c. to 50c. a ton in order to book tonnage.

Cast Iron Pipe

About 4200 tons of 30, 36 and 60-in. pipe is involved for a proposed water main which Buffalo contemplates laying in the near future. Specifications for this project have not yet been issued, pending approval of plans by municipal officials. A New Jersey public utility interest is taking bids on 625 tons of 4 and 6-in.; Arlington Water District, Poughkeepsie, N. Y., is inquiring for 450 tons of 8-in., and sewer projects in Westchester County, N. Y., will take a total of about 500 tons of 14 to 48-in. No sizable public awards were reported in the past week.

Reinforcing Bars

Prices are unchanged at 1.60c., Pittsburgh, or 1.93c., delivered New York. The West Side elevated highway is expected to require upward of 500 tons of reinforcing bars. Other new projects that appeared in the past week will take only small quantities of bars. About 225 tons of bars for the Tri-Borough bridge piers was placed by Rogers & Haggerty, Inc., general contractor, with Day & Goater, New York.

Old Material

The only movement of scrap from this district is in loading No. 1 and No. 2 heavy melting steel on barges for spring shipments to Buffalo consumers, for which $5.50 a ton, on barge, is being paid. The mill at Phoenixville, Pa., occasionally accepts a carload of stove plate and machine shop turnings and limited deliveries on contracts for heavy melting steel are permitted by consumers at Coatesville and Conshohocken, Pa.

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Pacific Coast Experiences Mild Upswing; Golden Gate Bridge Job Delayed Further

SAN FRANCISCO, Nov. 30.—The California Supreme Court handed down its long-awaited decision on Nov. 25, upholding the validity of the $35,000,000 bond issue and assessment district for the Golden Gate bridge. Three days later a representative of the opposition to the bridge filed a bill for injunction and restraining order in the Federal District Court. This will further delay sale of bonds and execution of material contracts. It is not expected that a final decision will be rendered for several months, and meanwhile it may be necessary to renew present optional contracts, or call for new bids if the bonds are finally indorsed legally.

Monthly summaries indicate that November showed a mild upswing in orders and shipments. Demand for sheets is below that for other forms of steel, and reinforcing bars move only in small quantities and have been less active during the past several weeks.

Further cuts and disturbance in the ocean freight rate on cast iron pipe affecting Gulf and Eastern seaboard shipments to the Pacific Coast tend to confuse further the uncertain cast iron pipe market.

Finished Steel

Open lettings for the week exceed 3200 tons, largely plates, and new inquiries, principally for Pacific Northwest highway bridges, approach 4300 tons. Awards for reinforcing bars total 700 tons, principally in small lots, with 600 tons newly in prospect. Thirty-seven hundred tons of shapes will be required for highway bridges in Oregon and Washington soon to be placed. Contracts were placed for 2250 tons of plates at Long Beach and Tacoma. The Western Pipe & Steel Co. is reported to be working 24 hr. a day in both its South San Francisco and Los Angeles plants on welded pipe and tank contracts.

Cast Iron Pipe

Pasadena, Cal., opened bids Dec. 2 on 1950 tons of 6 to 16-in. Beverly Hills, Cal., is planning a line that will require 200 tons of 16-in. Oakland, Cal., opened bids on 1000 tons of 4 to 8-in. Dec. 3. Little other tonnage is pending.

Steel Pipe

The International Utilities Corpn. is applicant before the Washington Department of Highways for a natural gas pipe line planned to tap natural gas fields in Wyoming, Montana and Idaho and serve communities along the Pacific highway in western Washington. It is announced as a $30,000,000 project.

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Higher Duty Asked for on Fabricating Tools

WASHINGTON, Dec. 1.—The Toledo Machine & Tool Co., Toledo, Ohio, has applied to the Tariff Commission for an increase in duties on power-driven machines for fabricating steel and on fixtures, tools, attachments and parts. The machinery duty at present is 40 per cent, while the existing duty on machine tools is 30 per cent.

New England Pig Iron Sales Only 900 Tons

BOSTON, Dec. 1.—Pig iron sales in the week did not exceed 900 tons, including two 100-ton lots to two Vermont foundries. The market is bare of prospects. Melters are holding up shipments. Instances are cited where iron bought last January has not been taken in.

Cast Iron Pipe

Kennebec, Me., water district has bought 204 tons of 8-in. Class C and 140 tons of 12-in. from the United States Pipe & Foundry Co., and 200 tons of 8-in. pipe was placed elsewhere. Business otherwise is in car lots. Braintree, Mass., has yet to cover on 600 tons, on which the Warren Pipe Co. of New England, Inc., is low bidder. A Maine project calls for 6000 ft. of 6-in. and 3000 ft. of 8-in. Shelton, Conn., has closed bids on a small tonnage of 4 and 6-in. The Metropolitan Water District, Connecticut, will soon take bids on a $3,000,000 water project at Barkhamsted. Prices range from $26 to $30 a ton, foundry, depending on the size of the business.

Reinforcing Steel

Lettings for the week were light, not more than 600 tons. New prospects call for 500 tons. Billet bars in 1 to 5-ton lots are 2.75c. a lb., base, from stock, and larger lots 2.15c., while rail steel bars are around 2c. a lb., delivered Boston rate points.

Old Material

Current business is confined to an occasional distress car, mostly of heavy melting steel, heavy cast, bundled skeleton and chemical borings. The more important scrap producers are unwilling to sell at current values, while dealers find it impossible to raise buying offers.

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St. Louis Pig Iron Dull; Scrap Orders Larger

ST. LOUIS, Dec. 1. An expected increase in buying of pig iron by implement manufacturers in the St. Louis trade territory has not yet materialized. Operators of these plants are proceeding slowly in the placing of orders for additional tonnages of raw material. Stove plants in the district curtailed operations last week during the Thanksgiving holiday period. This industry has been encouraged considerably because of the colder weather prevailing in most sections, being hopeful that this will result in clearing dealers' floors of stocks on hand and cause liberal reorders. Pig iron prices are unchanged.

Finished Steel

The requirements of tin plate for the canning plants of the Pet Milk Co. for 1932 will be approximately 25,000 tons. As reported by THE IRON AGE recently, contracts for these requirements have been awarded.

The Inland Steel Co. has reaffirmed its fourth quarter prices on steel sheets for first quarter. Buying of plates, shapes and bars continues at a low ebb, all factors evidently desiring to hold down their inventories until after the first of the year.

Open-hearth operations in the St. Louis industrial district continue at about 14 per cent of capacity.

Old Material

A district melter came into the market this week for specialties, buying at least 5000 tons from dealers here. With this and recent orders, dealers are said to have a heavier tonnage of unfilled orders on their books than for some time.

Selected heavy steel, No. 1 heavy melting, No. 2 railroad wrought, and iron car axles are 25c. a ton lower, and railroad springs are 25c. higher.

Railroad lists: Pennsylvania, 18,000 tons; Wabash, 5765 tons; New York, Chicago & St. Louis, 217 tons; New York Central, 90 carloads; St. Louis-San Francisco, 30 carloads.

Cast Iron Pipe

For the Mississippi River lock and dam at Rock Island, Ill., and Alma, Wis., 90,000 lb. of 18-in. to 36-in., 1500 lin. ft. of 24-in. cast iron pipe respectively will be required. Bids will be opened for the project on Dec. 17.

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Public Works Awards $30,087,212 in Week

WASHINGTON, Dec. 1.—Public and semi-public works contract awards amounting to $30,087,212 were reported to the Public Works Section of the President's Organization on Unemployment Relief last week. The addition of this amount brought the total of contract awards reported since Dec. 1, 1930, or one year ago, to $2,842,294,435.

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Potential copper requirements for repair work proposed by the President's Committee on Reconditioning, Remodeling and Modernization are estimated at approximately 270,000,000 lb., by the Copper and Brass Research Association, New York. This total is made up of 150,000,000 lb. of roofing and roof drainage material and 120,000,000 lb. of water piping.

Reinforcing Steel

Awards 4100 Tons—New Projects 3100 Tons

AWARDS

Erving-Gill, Mass., 150 tons, State bridge, to McClintic-Marshall Co.

Boston, 100 tons, Morton Street bridge, to Concrete Steel Co.

Revere, Mass., 200 tons, sea wall, to Barker Steel Co.

Albany, N. Y., 1800 tons, State bridge, to a local bidder.

Wilmington, Del., 250 tons, bridge, awarded by Seeds and Derhan, Philadelphia, to Concrete Steel Co.

Turtle Creek, Pa., 120 tons, Westinghouse High School, to Carlem Engineering Co.

Cleveland, 200 tons, North Woodland Road bridge, to Builders' Structural Steel Co.

Aurora, Ill., 250 tons, post office, to Calumet Steel Co.

Springfield, Ill., 150 tons, road work, to an unnamed bidder.

Pomona, Cal., 250 tons, Progress-Bulletin building, to Blue Diamond Corpn.

Bakersfield, Cal., 100 tons, Kress Store, to an unnamed bidder.

Los Angeles, 100 tons, Marion Davies Foundation Clinic building, to an unnamed bidder.

Letchworth, N. Y., 100 tons, State farm colony building, to Joseph T. Ryerson & Son, Inc.

Elmsford, N. Y., 210 tons, bridge and road work, to Tidewater Structural Material Corpn.

New York, 125 tons, Grand Central parkway, to Tidewater Structural Material Corpn.

NEW REINFORCING BAR PROJECTS

Waltham, Mass., 105 tons, State hospital.

Littleton, Mass., 125 tons, State bridge.

Needham-Wellesley, Mass., 100 tons, two State bridges.

Norfolk-Monson, Mass., 110 tons, State institutions.

Philadelphia, 600 tons, 300 tons for Benjamin Franklin school and 300 tons for school at Thirty-seventh and Tasker Streets.

Hinsdale, Ill., 100 tons, Spinsters' Home.

Chicago, 300 tons, West Side sewer for Sanitary District.

Quincy, Ill., 300 tons, hospital.

Mendocino County, Cal., 381 tons, two highway bridges.

Long Beach, Cal., 235 tons, grade crossing alternate.

Chico, Cal., 110 tons, library at State Teachers College.

New York, 500 tons, West Side elevated highway, Twenty-second Street to Thirty-eighth Street; bids being taken by borough president, Manhattan.

Plainfield, N. J., 100 tons, sewer project; bids in.

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Pipe Lines

Yount-Lee Oil Co., Beaumont, Tex., plans 10-in. pipe line from High Island oilfields to company terminal, Beaumont, 45 miles. Cost about $500,000.

Arkansas Valley Natural Gas Co., Shreveport, La., let contract to Western Construction Co., Tulsa, Okla., for pipe line from Rocky Ford, Colo., to Ordway, Sugar City, Fowler, Colo., and vicinity.

Moran Gas Co., Houston, Tex., applied for permission to install 3 and 4-in. pipe line for natural gas service at Harvey, Petal and other points in Forrest County, Miss.

Ajax Pipe Line Co. of New Jersey plans a 10-in. oil line from Glenpool, Okla., to Wood River, Ill.

Copper Advances on Limitation Agreement; Tin Declines Following Sterling

NEW YORK, Dec. 1.—Adherence of both the Katanga and Rhodesian copper producers to the agreement for world curtailment of copper output leaves out only certain minor producers. Just prior to receipt of advices from abroad that these foreign interests would limit output, an important American producer, the Phelps Dodge Corpn., announced its intention of withdrawing from membership in Copper Exporters, Ltd., effective in 30 days.

With world limitation of copper production substantially in effect now, except for the minor producers, which may be included in the near future, efforts are being made to revise the rules governing foreign marketing of copper through Copper Exporters, Inc. Curtailment of world output has necessitated including certain grades, such as cathode, casting and highly refined copper, not formerly supervised and allocated by that organization.

Following the news of foreign agreement to curtailment of world copper output received on Nov. 26, the price of electrolytic copper advanced from its previous low of 6.25c., delivered Connecticut Valley, to 6.50c., delivered, on Friday and to 6.75c. on Saturday. Yesterday, Nov. 30, some substantial transactions were recorded and the market dipped to the 6.50c., level, but custom smelters are today asking 6.75c. a lb., delivered, as a minimum. Lake copper is moderately active and firm at 6.87½c., delivered.

The price of Copper Exporters, Inc., has continued at 7c. a lb., delivered usual European ports. Export sales for November were about 25,000 tons, including 1600 tons of business taken yesterday.

Copper Averages

The average price of Lake copper based on daily quotations in THE IRON AGE, is 7.18c. a lb. delivered New York, for November. The average price of electrolytic copper is 6.54c., refinery, or 6.79c. delivered in the Connecticut Valley.

Tin

Consumers have been moderately active the past week, buying tin for first and into second quarter delivery. Meanwhile, the price here has steadily declined from 22.75c. a lb., New York, on Nov. 25, to 21c. today. This decline is the result of lowered value of the pound sterling, price advances on tin made in London during the week having been insufficient to offset the rapid downward movement in pound sterling. London prices today are £138 7s. 6d. for spot standard, £141 for future standard and £141 17s. 6d. for spot Straits. The Singapore price is £142 15s. a ton.

With the recently announced curtailment of output in the East by another 10 per cent, or about 1250 tons, to become effective Jan. 1, and the pool of interests with which the Malayan Government is cooperating, actively buying to stabilize the market, the outlook for a stronger tin market in the future is considered good. At the end of November the world's visible supply of tin had decreased 19 tons to a total of 50,583 tons. While world stocks of copper have increased 2000 tons since August, this is not generally considered unusual in view of the low rate of consumption at present.

Stocks of tin in United Kingdom warehouses at the end of last week were 30,510 tons, a decrease of 40 tons in the week. Shipments of tin from the Straits for November were only 5360 tons, which is under the estimates originally made for the month. During November 3550 tons of tin came to the United States, of which 3500 tons were delivered to Atlantic Coast ports and the remainder to the Pacific Coast. Stocks in warehouse in New York at the end of November were 3006 tons, with 4452 tons landing at the port of New York.

Lead

Substantial sales of lead in the past week for delivery in late December are believed by sellers to indicate that consumers are beginning to cover requirements farther into the future. Prices are firm at 3.65c., St. Louis, and 3.85c., New York. Curtailment of copper output is expected to have some effect on production of lead ores.

Zinc

Buying has been light the past week, but quotations of 3.12½c., East St. Louis, and 3.47½c., New York, are slightly firmer in sympathy with a stronger copper market.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 1	Nov. 30	Nov. 28	Nov. 27	Nov. 25
Lake copper, New York	6.87½	6.87½	6.87½	6.87½	6.87½
Electrolytic copper, N. Y.*	6.50	6.25	6.50	6.25	6.00
Straits tin, spot, N. Y.	21.00	21.40	22.12½	22.25	22.75
Zinc, East St. Louis	3.12½	3.12½	3.12½	3.12½	3.12½
Zinc, New York	3.47½	3.47½	3.47½	3.47½	3.47½
Lead, St. Louis	3.65	3.65	3.65	3.65	3.65
Lead, New York	3.85	3.85	3.85	3.85	3.85

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.50c. a lb., New York.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	24.00c. to 25.00c.
Tin, bar	26.00c. to 28.00c.
Copper, Lake	9.00c. to 10.00c.
Copper, electrolytic	8.50c. to 9.00c.
Copper, casting	8.25c. to 8.75c.
*Copper sheets, hot-rolled	15.87½c.
*High brass sheets	13.00c.
*Seamless brass tubes	16.25c.
*Seamless copper tubes	15.62½c.
*Brass rods	10.75c.
*Brazed brass tubes	21.75c.
Zinc, slab	4.75c. to 5.25c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	6.50c. to 7.50c.
Lead sheets	8.25c.
Antimony, Asiatic	9.00c. to 10.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	17.00c. to 18.00c.
Solder, ½ and ½	15.75c. to 16.75c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	26.50c.
Tin, bar	28.50c.
Copper, Lake	8.37½c.
Copper, electrolytic	8.37½c.
Copper, castings	8.00c.
Zinc, slab	4.75c. to 5.00c.
Lead, American pig	4.50c. to 4.75c.
Lead, bar	7.75c.
Antimony, Asiatic	10.00c.
Babbitt metal, medium grade	15.00c.
Babbitt metal, high grade	30.50c.
Solder, ½ and ½	19.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.25c.	6.00c.
Copper, hvy. and wire	5.00c.	5.75c.
Copper, light and bottoms	4.00c.	4.75c.
Brass, heavy	2.50c.	3.25c.
Brass, light	2.00c.	2.75c.
Hvy. machine composition	4.00c.	4.75c.
No. 1 yel. brass turnings	3.00c.	3.50c.
No. 1 red brass or compos. turnings	3.50c.	4.25c.
Lead, heavy	2.75c.	3.25c.
Zinc	1.25c.	1.75c.
Sheet aluminum	9.00c.	11.00c.
Cast aluminum	3.25c.	5.00c.

▲▲▲ Prices of Finished and Semi-Finished Steel,

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.60c. to 1.70c.
Del'd Philadelphia	1.89c.
Del'd New York	1.93c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.70c.
F.o.b. Birmingham	1.70c.
C.i.f. Pacific ports	2.00c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.60c.
F.o.b. Birmingham, mill lengths	1.75c.
F.o.b. Cleveland	1.50c. to 1.55c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.30c. to 1.35c.
F.o.b. Chicago Heights mill	1.50c. to 1.60c.
Del'd Philadelphia	1.49c. to 1.59c.

Iron

Common iron, f.o.b. Chicago	1.60c. to 1.70c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.69c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.60c. to 1.70c.
F.o.b. Birmingham	1.70c.
Del'd Cleveland	1.78½c.
Del'd Philadelphia	1.73½c. to 1.78½c.
F.o.b. Coatesville	1.70c.
F.o.b. Sparrows Point	1.70c.
F.o.b. Lackawanna	1.70c.
Del'd New York	1.83c. to 1.88c.
C.i.f. Pacific ports	1.85c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.50c. to 1.60c.
F.o.b. Chicago	1.60c. to 1.70c.
F.o.b. Birmingham	1.70c.
F.o.b. Lackawanna	1.70c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.68½c. to 1.78½c.
Del'd Philadelphia	1.64½c. to 1.69½c.
Del'd New York	1.85¼c.
C.i.f. Pacific ports (standard)	2.05c.
C.i.f. Pacific ports (wide flange)	2.15c.

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential per 100 Lb.
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.90 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.25
6100	Chromium Vanadium Spring Steel	0.85
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold-Finished Bars

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.00c. to 2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.70c.
No. 10, f.o.b. Chicago mills	1.80c.
No. 10, del'd Philadelphia	1.99c.
No. 10, f.o.b. Birmingham	1.85c.
No. 10, c.i.f. Pacific Coast ports	2.33c.

Hot-Rolled and Annealed

No. 10, Pittsburgh	1.85c.
No. 10, Chicago mills	1.95c.
No. 10, Birmingham	2.00c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Chicago mills	2.50c.
No. 24, del'd Philadelphia	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, c.i.f. Pacific Coast ports	2.88c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.35c.
No. 10 gage, f.o.b. Chicago mills	2.45c.
No. 10 gage, del'd Philadelphia	2.64c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Chicago mills	3.05c.
No. 20 gage, del'd Philadelphia	3.24c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.10c.

Steel Furniture Sheets

No. 10, f.o.b. Pittsburgh	2.75c.
No. 20, f.o.b. Pittsburgh	3.35c.

(Prices on furniture stock include stretcher leveling but not resquaring.)

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago mills	3.00c.
No. 24, del'd Philadelphia	3.19c.
No. 24, f.o.b. Birmingham	3.05c.
No. 24, c.i.f. Pacific Coast ports	3.38c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. P'gh	3.05c. to 3.15c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	2.75c.
No. 20, f.o.b. Pittsburgh	3.25c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.65c.
No. 28, Chicago mills	2.75c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills	$4.75
Standard cokes, f.o.b. Gary	4.85

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $9.50	25-lb. coating I.C. $14.10
15-lb. coating I.C. 12.00	30-lb. coating I.C. 14.90
20-lb. coating I.C. 13.00	40-lb. coating I.C. 16.70

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, Pittsburgh	1.60c.
Wider than 6 in., P'gh	1.50c.
6 in. and narrower, Chicago	1.70c.
Wider than 6 in., Chicago	1.60c.
Cooperage stock, P'gh	1.75c. to 1.85c.
Cooperage stock, Chicago	1.85c. to 1.95c.

Cold-Rolled Strips

F.o.b. P'gh	2.05c.
F.o.b. Cleveland	2.05c.
F.o.b. del'd Chicago	2.33c.
F.o.b. Worcester	2.20c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.10c.

*According to size.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49½	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Bolts, Nuts, Coke, Coal, Fuel Oil, Cast Iron Pipe

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

	Base per Keg
Standard wire nails	$1.90
Smooth coated nails	1.90
Galvanized nails	3.90
	Base per Lb.
Smooth annealed wire	2.35c.
Smooth galvanized wire	2.80c.
Polished staples	2.35c.
Galvanized staples	2.60c.
Barbed wire, galvanized	2.55c.
Woven wire fence, Nos. 9 and 11 gage, per net ton	$55.00
Woven wire fence, No. 12½ gage and lighter, per net ton	60.00

To Retail Trade

	Base per Keg
Standard wire nails	$2.00
Cement coated nails	2.00
Galvanized nails	4.00
	Base per Lb.
Smooth annealed wire	2.45c.
Smooth galvanized wire	2.90c.
Polished staples	2.45c.
Galvanized staples	2.70c.
Barbed wire, galvanized	2.65c.
Woven wire fence, Nos. 9 and 11 gage, per net ton	$60.00
Woven wire fence, 12½ gage and lighter, per net ton	65.00

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝-in. and larger	$2.70
Spikes, ½ in. and larger	2.70
Spikes, boat and barge	2.90
Tie plate, steel	1.85
Angle bars	2.15
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73, 10 and 10
†Carriage bolts	73, 10 and 10
Lag bolts	73, 10 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads	73, 10 and 10
Hot-pressed nuts, blank or tapped, square	73, 10 and 10
Hot-pressed nuts, blank or tapped, hexagons	73, 10 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	73, 10 and 10
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅞ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	73, 10 and 10
Semi-finished hexagons castellated nuts, S.A.E.	73, 10 and 10
Stove bolts in packages, P'gh	80, 25 and 10
Stove bolts in packages, Ch'go	80, 25 and 10
Stove bolts in pkgs., Cleveland	80, 25 and 10
Stove bolts in bulk, P'gh	80, 25, 10 and 2½
Stove bolts in bulk, Ch'go	80, 25, 10 and 2½
Stove bolts, in bulk, Cleveland	80, 25, 10 and 2½
Tire bolts	60, 10 and 10

Discounts of 73, 10 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(⅝-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$29.00
Rerolling, 4-in. and under 10-in., Youngstown	29.00
Rerolling, 4-in. and under 10-in., Cleveland	29.00
Rerolling, 4-in. and under 10-in., Chicago	31.00
Forging quality, Pittsburgh	35.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$29.00
Youngstown	29.00
Cleveland	29.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$29.00
Youngstown	29.00
Cleveland	29.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.40
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.50
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd	10.50
Foundry, by-product, Newark or Jersey City, delivered	8.70 to 9.10
Foundry, by-product, Phila.	$9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.10 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.50 to 1.60
Gas coal, ⅜-in., f.o.b. Pa. mines	$1.70 to $1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	0.35 to 0.45
Gas slack, f.o.b. W. Pa. mines	0.55 to 0.75

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	3.50c.
No. 4 industrial	3.00c.
	Per Gal. f.o.b. Baltimore
No. 3 distillate	3.50c.
No. 4 industrial	3.25c.

FLUXES AND REFRACTORIES

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$13.00
No. 2 lump, Illinois and Kentucky mines	17.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$40.00	$32.00 to $35.00
Maryland	40.00	32.00 to 35.00
New Jersey	$44.00 to 59.00	.....
Ohio	40.00	32.00 to 35.00
Kentucky	40.00	32.00 to 35.00
Missouri	37.00	32.00 to 35.00
Illinois	40.00	32.00 to 35.00
Ground fire clay, per ton	6.50	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00
Chicago	49.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$40.00 to $44.00
4-in., del'd Chicago	43.00 to 47.00
6-in. and larger, del'd New York	$32.90
4-in., del'd New York	35.90
6-in. and larger, Birmingham	$32.00 to 33.00
4-in., Birmingham	$35.00 to $36.00

Class "A" and gas pipe, $3 extra.

Pig Iron Prices for All Districts

VALLEY

Per gross ton, f.o.b. Valley furnace:

Basic	$15.00
Bessemer	16.50
Gray forge	16.00
No. 2 foundry	16.00
No. 3 foundry	15.50
Malleable	16.50
Low phos., copper free	$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$15.50 to $16.00
No. 2 foundry	17.00
No. 2 foundry	16.50
Malleable	17.00
Bessemer	17.00

Freight rates to points in Pittsburgh district range from 63c to $1.12.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$17.00
N'th'n No. 3 fdy.	17.50
Malleable, not over 2.25 sil.	17.00
High phosphorus	17.00
Lake Shore, charcoal, sil. 1.50	$23.01 to 25.04
S'th'n No. 2 fdy.	17.01
Low phos., sil. 1 to 2, cop. per free	28.50 to 29.20
Silvery, sil. 8 per cent	24.73
Bess. ferrosilicon, 14-15%	31.25

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including an average switching charge of 61c per gross ton.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., del'd St. Louis	19.16
South'n No. 2 fdy., deliv'd	15.42
Northern malleable, deliv'd	19.16
Northern basic, deliv'd	19.16

Freight rates 75c (average) Granite City to St. Louis; $2.16 from Chicago; $1.42 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

*Buffalo, No. 2, del'd east. N. J.	$17.78 to $18.28
East. Pa. No. 2 fdy.	16.89 to 17.39
East. Pa. No. 2X fdy.	17.89 to 18.39

Freight rates: $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$17.00
No. 2X fdy.	17.50
No. 1 fdy.	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	25.28

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.91
*Buffalo, sil. 2.25 to 2.75	19.91
*Ala., sil. 1.75 to 2.25	$20.11 to 20.61
*Ala., sil. 2.25 to 2.75	20.61 to 21.11
†Ala., sil. 1.75 to 2.25	16.75
†Ala., sil. 2.25 to 2.75	17.25

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$14.69
Ala. fdy., sil. 2.25 to 2.75	15.19
Tenn. fdy., sil. 1.75 to 2.25	14.69
N'th'n No. 2 foundry	17.90
S'th'n Ohio silvery, 8 per cent	21.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.59 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$15.51 to $16.01
East. Pa. No. 2X	16.01 to 16.51
East. Pa. No. 1X	16.51 to 17.01
Basic (del'd east. Pa.)	16.51
Malleable	18.50 to 19.00
Stand. low phos. (f.o.b. east. Pa. furnace)	23.00 to 24.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2 plain	22.01
Va. No. 2X	22.51

Prices, except as specified otherwise are deliv'd Philadelphia. Freight rates 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$17.00
S'th'n fdy., sil. 1.75 to 2.25	17.00
Malleable (local delivery)	17.00
Ohio silvery, 8 per cent	23.00
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except Southern foundry and silvery iron. Freight rates: 50c, average local switching charge; $3 from Jackson, Ohio; $6 from Birmingham.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$12.00
No. 1 fdy., 2.25 to 2.75 sil.	12.50
Basic	12.00

CANADA

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Prices of Ores and Ferroalloys

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry, Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, aver. 68% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	8.00c.
Iron, basic and foundry, Russian, aver. 63% iron (nom.)	9.00c.
Manganese, Caucasian, washed 52%	24.00c.
Manganese, African, Indian, 50-52%	23c. to 24c.
Manganese, Brazilian, 46 to 48%	22c. to 23c.
Tungsten, 60% concentrates	$12.00 to $12.50

	Per Gross Ton
Chrome, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$18.00
Chrome, 48% Cr_2O_3 c.i.f. Atlantic seaboard	20.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	*$80.00 to $85.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*80.00 to 85.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$27.00 to $30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	31.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$22.00	13%	$24.50
11%	22.50	14%	26.50
12%	23.50	15%	28.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$19.00	11%	$21.50
7%	19.50	12%	22.50
8%	20.00	13%	23.50
9%	20.50	14%	25.50
10%	21.00	15%	27.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	24.50c. to 26.00c.
Ferrochromium, 0.06% carbon	26.50c. to 28.00c.
Ferrovanadium, per lb. Va. furn.	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferromolybdenum, per lb. Mo., del.	1.00
Calcium molybdate, per lb. Mo., del.	85c.
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered: 2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	$5 a ton higher

Old Material Quotations

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00 to	$10.50
No. 2 heavy melting steel	9.00 to	9.50
No. 2 railroad wrought	10.00 to	10.50
Scrap rails	10.00 to	10.50
Rails 3 ft. and under	12.00 to	12.50
Short bar crops, ordinary	11.00 to	11.50
Compressed sheet steel		10.00
Hvy. bundled sheet steel	9.00 to	9.50
Hvy. steel axle turnings	9.25 to	9.75
Machine shop turnings	6.75 to	7.25
Short shov. steel turnings	6.75 to	7.25
Short mixed borings and turnings	6.75 to	7.25
Cast iron borings	6.75 to	7.25
Cast iron carwheels	10.50 to	11.00
Heavy breakable cast	8.00 to	8.50
No. 1 cast	9.50 to	10.50
Hvy. knuckles and couplers	10.50 to	11.50
Rolled coil and leaf springs	10.50 to	11.50
Rolled steel wheels	10.50 to	11.50
Low phos. billet crops	13.00 to	13.50
Low phos. sheet bar crops	12.50 to	13.00
Low phos. plate scrap	10.00 to	11.50
Low phos. punchings	12.50 to	13.00
Steel car axles	15.50 to	16.50

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel	$7.75 to	$8.25
Shoveling steel	7.75 to	8.25
Frogs, switches and guards	7.75 to	8.25
Heavy hyd. comp. sheets	6.00 to	6.50
Drop forge flashings	5.00 to	5.50
Cut 2 bushelings	5.50 to	6.00
Steel carwheels	8.25 to	9.25
Railroad tires	9.00 to	9.50
Rolled leaf springs	9.50 to	10.00
Axle turnings	6.00 to	6.50
Hvy. couplers and knuckles	8.50 to	9.00
Coil springs	9.50 to	10.00
Axle turnings	6.00 to	6.50
Low phos. punchings	10.00 to	10.50
Low phos. plates, 12 in. and under	9.00 to	9.50
Cast iron borings	4.00 to	4.50
Short shoveling turnings	4.50 to	5.00
Machine shop turnings	4.00 to	4.50
Railroad rails	10.50 to	11.00
Street rails, less than 3 ft.	9.25 to	9.75
Street rails, less than 2 ft.	10.00 to	10.50
Angle bars, steel	8.25 to	8.75
Cast iron carwheels	8.50 to	9.00
Railroad malleable	7.00 to	7.50
Agricultural malleable	7.00 to	7.50
Relaying rails, 56 to 60 lb.	19.00 to	21.00
Relay rails, 65 lb. and up	22.00 to	27.00

Per Net Ton

Iron angle and splice bars	7.00 to	7.50
Iron arch bars, transoms	7.50 to	8.00
Steel car axles	13.50 to	14.50
Iron car axles	10.50 to	11.00
No. 1 railroad wrought	6.50 to	7.00
No. 2 railroad wrought	6.75 to	7.25
No. 1 bushelings	5.00 to	5.50
No. 2 bushelings	4.00 to	4.50
Locomotive tires, smooth	8.00 to	9.00
Tires and flues	3.50 to	4.00
No. 1 machinery cast	8.50 to	9.00
No. 1 railroad cast	7.00 to	7.50
No. 1 agricultural cast	7.00 to	7.50
Stove plate	6.25 to	6.75
Grate bars	5.50 to	6.00
Brake shoes	5.75 to	6.25

Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.50 to	$8.50
No. 2 heavy melting steel	6.50 to	7.00
No. 1 railroad wrought	9.50 to	10.00
Bundled sheets		6.00
Hydraulic compressed, new	7.00 to	7.50
Hydraulic compressed, old	6.00 to	6.50
Machine shop turnings		5.50
Heavy axle turnings	7.00 to	8.00
Cast borings (nom.)		3.50
Heavy breakable cast		9.50
Stove plate (steel works)		7.50
No. 1 low phos. hvy.	11.00 to	12.00
Couplers and knuckles		11.00
Rolled steel wheels	10.00 to	10.50
No. 1 blast furnace		3.50
Cast iron and steel pipe		10.50
Shafting	15.00 to	15.50
Steel axles	15.00 to	15.50
No. 1 forge fire	7.50 to	8.00
Cast iron carwheels	11.50 to	12.00
No. 1 cast		10.50
Cast borings (chem.)	11.50 to	12.00
Steel rails for rolling		10.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.50 to	$8.00
No. 2 heavy melting steel	6.75 to	7.25
Compressed sheet steel	7.00 to	7.25
Light bundled sheet stampings	6.00 to	6.50
Drop forge flashings	6.00 to	6.25
Machine-shop turnings	4.75 to	5.25
Short shoveling turnings	5.75 to	6.25
No. 1 busheling	6.50 to	6.75
Steel axle turnings	7.50 to	8.00
Low phos., billet crops	14.00 to	14.50
Cast iron borings	5.25 to	5.75
Mixed borings and short turnings	5.25 to	5.75
No. 2 busheling	5.25 to	5.75
No. 1 cast	9.00 to	9.50
Railroad grate bars	6.00 to	6.50
Stove plate	6.00 to	6.50
Rails under 3 ft.	15.00 to	15.50
Rails for rolling	13.00 to	13.50
Railroad malleable	11.00 to	11.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel		$8.50
No. 2 heavy melting scrap	$7.00 to	7.50
Scrap rails	9.50 to	10.00
New hydraul. comp. sheets		7.00
Old hydraul. comp. sheets		6.00
Drop forge flashings		7.00
No. 1 busheling	7.25 to	7.75
Hvy. steel axle turnings	8.00 to	8.50
Machine shop turnings	4.50 to	5.00
Knuckles and couplers		10.00
Coil and leaf springs		10.00
Rolled steel wheels		10.00
Low phos. billet crops	12.50 to	13.00
Short shov. steel turnings	7.00 to	7.50
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
No. 2 busheling	4.50 to	5.00
Steel car axles		12.00
Iron axles	16.00 to	16.50
No. 1 machinery cast	10.00 to	10.50
Stove plate	8.25 to	8.50
Steel rails, 3 ft. and under	12.00 to	12.50
Cast iron carwheels	10.50 to	11.00
Industrial malleable	10.00 to	10.50
Railroad malleable	10.00 to	10.50
Chemical borings	9.00 to	9.50

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$8.50 to	$9.00
Scrap steel rails	8.00 to	8.50
Short shoveling turnings	4.00 to	5.00
Stove plates		6.00
Steel axles		14.00
Iron axles		14.00
No. 1 railroad wrought		6.50
Rails for rolling		10.00
No. 1 cast		9.00
Tramcar wheels	10.00 to	10.25
Cast iron borings, chem.	12.00 to	12.50

ST. LOUIS

Dealers' buying prices per gross ton:

Selected heavy steel	$7.00 to	$7.50
No. 1 heavy melting	6.50 to	7.00
No. 2 heavy melting	6.50 to	7.00
No. 1 locomotive tires	8.00 to	8.50
Misc. stand-sec. rails	8.25 to	8.75
Railroad springs	8.75 to	9.25
Bundled sheets	4.25 to	4.75
No. 2 railroad wrought	6.50 to	7.00
No. 1 busheling	6.00 to	6.50
Cast iron borings and shoveling turnings	4.75 to	5.25
Iron rails	7.00 to	8.00
Rails for rolling	9.50 to	10.00
Machine shop turnings	3.00 to	3.50
Heavy turnings	5.50 to	6.00
Steel car axles	10.50 to	11.00
Iron car axles	14.00 to	14.50
Wrot. iron bars and trans.	5.25 to	5.75
No. 1 railroad wrought	5.00 to	5.50
Steel rails, less than 3 ft.	10.00 to	10.50
Steel angle bars	7.00 to	7.50
Cast iron carwheels	6.50 to	7.00
No. 1 machinery cast	8.00 to	8.50
Railroad malleable	5.50 to	6.00
No. 1 railroad cast	6.25 to	6.75
Stove plate	6.00 to	6.50
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	5.00 to	5.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$4.50 to	$5.50
Heavy melting steel (yard)	2.75 to	3.00
No. 1 hvy. breakable cast		5.50
Stove plate (steel works)		3.50
Machine shop turnings		2.00
Short shoveling turnings		2.00
Cast borings		2.50
No. 1 blast furnace		2.50
Steel car axles	11.00 to	11.50
Iron car axles (nom.)	14.00 to	14.50
Spec. iron and steel pipe		5.50
Forge fire	3.25 to	3.75
No. 1 railroad wrought	5.00 to	5.25
No. 1 yard wrought, long	4.00 to	4.25
Rails for rolling	6.00 to	6.25
Stove plate (foundry)	4.75 to	5.50
Malleable cast (railroad)	6.00 to	6.50
Cast borings (chemical)	8.00 to	8.50

Per gross ton, delivered local foundries:

No. 1 machinery cast		$8.50
No. 1 hvy. cast (cupola size)		6.50
No. 2 cast		5.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$3.80 to	$4.60
Scrap T rails	3.10 to	4.60
Machine shop turnings	1.25 to	2.10
Cast iron borings	1.50 to	1.75
Bundled skeleton, long	3.00 to	3.25
Forge flashings	2.00 to	3.50
Blast furnace scrap	1.25 to	1.30
Forged scrap	2.00 to	2.50
Shafting	10.00 to	10.50
Steel car axles	11.00 to	12.00
Wrought pipe	4.00 to	4.25
Rails for rolling	6.00 to	6.50
Cast iron borings, chemical	7.00 to	7.25

Per gross ton delivered consumers' yards:

Textile cast	$8.75 to	$9.25
No. 1 machinery cast	8.75 to	9.25
Stove plate	5.00 to	5.25
Railroad malleable	10.50 to	11.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$6.75 to	$7.25
Scrap rails for melting	8.50 to	9.00
Loose sheet clippings	3.50 to	4.00
Bundled sheets	5.50 to	6.00
Cast iron borings	3.25 to	3.75
Machine shop turnings	4.00 to	4.50
No. 1 busheling	5.00 to	5.50
No. 2 busheling	3.25 to	3.75
Rails for rolling	9.00 to	9.50
No. 1 locomotive tires	8.50 to	9.00
No. 2 railroad wrought	6.75 to	7.25
Short rails	11.75 to	12.25
Cast iron carwheels	8.25 to	8.75
No. 1 machinery cast	10.00 to	10.50
No. 1 railroad cast	8.75 to	9.25
Burnt cast	4.25 to	4.75
Stove plate	4.25 to	4.75
Brake shoes	4.25 to	4.75
Agricultural malleable	8.00 to	8.50
Railroad malleable	9.00 to	9.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting	$6.00 to	$6.50
Borings and short turnings	3.75 to	4.25
Long turnings	3.50 to	4.00
No. 1 machinery cast	8.50 to	9.00
Automotive cast	11.00 to	11.50
Hydraul. comp. sheets	5.75 to	6.25
Stove plate	5.00 to	5.50
New No. 1 busheling	5.00 to	5.50
Old No. 2 busheling	3.25 to	3.75
Sheet clippings	3.50 to	4.00
Flashings	5.25 to	5.75

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast		10.00
Stove plate		8.00
Standard carwheels		8.50
Malleable		8.00

Warehouse Prices for Iron and Steel Products

CHICAGO

	Base per Lb
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel	1.50c. to 1.80c.
Rail steel reinforcement—	
For buildings	1.30c. to 1.40c.
Highway slabs	1.40c.
For bridges and culverts	1.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.10c.
Flats and squares	3.60c.
Bands, ⅞ in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galv. sheets (No. 24)	4.10c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes (⅜ in. and larger)	3.45c.
Track bolts	4.30c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	73
Carriage bolts	73
Coach and lag screws	73
Hot-pressed nuts, sq., tap. or blank	73
Hot-pressed nuts, hex., tap. or blank	73
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex.	3.10c.
Cold-fin. flats and sq.	3.60c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.00c.
Hoops and bands, No. 13 and lighter	3.55c.
Cold-finished strip	*5.55c.
Hot-rolled annealed sheets (No. 24)	3.60c.
Galvanized sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.00c.
No. 9 ann'l'd wire, per 100 lb.	$2.25
No. 9 galv. wire, per 100 lb.	2.70
Com. wire nails, base per keg	2.25

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex.	3.50c.
Squares	4.00c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.50
4-in.	36.00
Lap-welded steel boiler tubes, 2-in.	16.50
4-in.	34.50

BUFFALO

	Base per Lb
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Hot-rolled sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.45
Black wire, base per 100 lb.	3.20

NEW YORK

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Hot-rolled sheets (No. 10)	3.00c. to 3.25c.
Hot-rolled ann'l'd sheets (No. 24*)	3.60c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ⅜ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¾ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10

Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.35c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.00c.
Boiler rivets	4.00c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	73
Carriage bolts	73
Lag screws	73
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	73
Less than 200 lb.	63
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	73
Less than 200 lb.	63

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates and struc. shapes, ¼-in. and heavier	2.80c.	3.00c.	2.50c.
Soft steel bars	2.80c.	3.00c.	2.50c.
Reinforcing bars	2.80c.	2.80c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.90c.	4.00c.	4.00c.
Hot-rolled sheets (No. 10)	3.40c.	3.50c.	3.50c.
Galv. sheets (No. 24)	4.40c.	4.20c.	4.50c.
Struc. rivets, ½ in. and larger, less than 1000 lb.	5.00c.	5.00c.	5.50c.
Special nails: common 4 to 60d; smooth box 4 to 20d; finish 6 and 8 d; base per keg	$2.55	$2.45	$2.40
Other wire nails, base per keg	2.80	2.70	2.65
Cement c't'd nails, 100-lb. keg	2.65	2.70	2.65

San Francisco and Los Angeles schedule subject to allowance of 10c. per 100 lb. for 5000 lb. or over.

Seattle schedule subject to allowance of 25c. per 100 lb. for 500 lb. or over.

PITTSBURGH

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	3.10c.
Squares and flats	3.60c.
Bands	2.95c.
Hoops	3.60c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.05c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	3.15c. to 3.20c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.74c.
Spikes, large	2.50c.
Small	2.75c. to 2.90c.
Boat	3.00c.
Track bolts, all sizes, per 100 count,	70 and 10 per cent off list
Machine bolts, 100 count,	70 and 10 per cent off list
Carriage bolts, 100 count,	70 and 10 per cent off list
Nuts, all styles, 100 count,	73 and 10 per cent off list
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.30
Wire, galv. soft, base per 100 lb.	2.75
Common wire nails, per keg	2.25
Cement coated nails, per keg	2.25

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

PHILADELPHIA

	Base per Lb.
Plates, ¼-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to ⅛-in., inclu.	2.90c.
Spring steel	5.00c.
Hot-rolled box annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	4.00c.
Hot rolled blue annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼-in.	5.20c.
Swedish iron bars	6.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

BOSTON

	Base per Lb.
Plates	*3.35c.
Structural shapes	*3.35c.
Soft steel bars, small shapes	*3.25c.
Reinforcing bars	3.10c. to 3.25c.
Iron bars—	
Refined	3.25c.
Best refined	4.60c.
Spring steel, open-hearth	5.00c.
Tire steel	4.50c. to 4.75c.
Bands	*3.75c. to 4.25c.
Hoop steel	4.90c. to 5.40c.
Cold-rolled steel—	
Rounds and hex.	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts	40 and 10
Cold-punched nuts	40 and 10
Stove bolts	70 and 10

*Base price (250 to 999 lb.); less than 250 lb., add 50c. per 100 lb.; 1000 to 7999 lb., deduct 15c.; 8000 to 14,999 lb., deduct 25c.; 15,000 lb. and larger lots, deduct 35c.

Fabricated Structural Steel

New Projects of 31,000 Tons Include Elevated Highway in New York—Awards of 12,500 Tons

NEW fabricated structural steel projects are larger this week, with a total of 31,000 tons, compared with only 13,000 tons a week ago. The only sizable new business is 13,300 tons for a section of the West Side express highway in New York, from Twenty-second to Thirty-eighth Streets, and 1200 tons for a New York Central Railroad viaduct through the Bell Telephone Laboratories, also on the West Side of New York.

Awards of 12,500 tons compare with 14,500 tons a week ago and include 5450 tons for the Albany-Rensselaer, N. Y., bridge, and 2000 tons for a municipal exhibition hall in Cleveland. Awards follow:

NORTH ATLANTIC STATES

Dedham, Mass., 318 tons, high school, to Boston Structural Steel Co., Inc.

Boston, 260 tons, State bridge at Morton Street, to American Bridge Co.

Cambridge, Mass., 200 tons, court house addition, to Boston Structural Steel Co., Inc.

Worcester, Mass., 100 tons, incinerator, to Eastern Bridge & Structural Co.

State of Massachusetts, 450 tons, highway bridges near Worcester, to McClintic-Marshall Corpn.

Albany-Rensselaer, N. Y., 5450 tons, bridge, to McClintic-Marshall Corpn.

New York, 105 tons, Children's Court recreation building in Queens, to J. Klein Ornamental Iron Works, Astoria, N. Y.

New York, 240 tons, First Congregational Church, Eightieth Street, to George A. Just Co.

State of New York, 165 tons, Rensselaer County bridge, to American Bridge Co.

Mount Vernon, N. Y., 100 tons, Gristede Brothers building, to Belmont Iron Works.

Dover, Del., 267 tons, State House, to Lehigh Structural Steel Co.

Wilmington, Del., 260 tons, bridge to American Bridge Co.

Philadelphia, 300 tons, bridge at Sixteenth Street for Reading Co., to American Bridge Co.

Altoona, Pa., 385 tons, post office to McClintic-Marshall Corpn.

THE SOUTH

Greensboro, N. C., 725 tons, post office, to Virginia Bridge & Iron Co.

CENTRAL STATES

Linton, Ind., 700 tons, tipple and coal washer for Linton Summitt Coal Co., to McNally-Pittsburgh Mfg. Corpn.

Joliet, Ill., 200 tons, Brandon Road bridge for Illinois Waterways, to Independent Bridge Co.

St. Louis, 100 tons, Biddle Street market for Board of Public Service, to Kaysing Iron Works.

Cleveland, 2000 tons, municipal exhibition hall and garage, to American Bridge Co.

Parma, Ohio, 120 tons, reservoir, to Fort Pitt Bridge Works Co.

WESTERN STATES

San Francisco, 325 tons, steel piling for Third Street bridge, to Pacific Coast Steel Co.

NEW STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

New York, 13,300 tons, section of West Side elevated express highway.

New York, 1200 tons, viaduct through Bell Telephone Laboratories for New York Central Railroad.

New York, 500 tons, addition to Bowery Savings Bank Building on East Forty-Second Street.

Brooklyn, 2900 tons, State hospital; previously reported as 300 tons.

Jamaica, N. Y., 2500 tons, 104th Field Artillery Armory; previously reported as 1200 tons.

Kings Park, N. Y., 300 tons, building for Kings Park State Hospital.

Rockaway Beach, N. Y., 200 tons, hospital.

Lehigh County, Pa., 500 tons, State highway bridge.

Washington, 400 tons, incinerator plant.

Pennsylvania Railroad, 600 tons, signal bridges at Perrysville, Md.

Philadelphia, 300 tons; 150 tons for Benjamin Franklin school and 150 tons for school at Thirty-seventh and Tasker Streets.

Philadelphia, 3000 tons, Benjamin Franklin Memorial building; bids to be asked Dec. 21.

Milton, Del., 150 tons, grade and high school.

Coatesville, Pa., 100 tons, addition to Veterans' Hospital; bids open Dec. 29.

Ithaca, N. Y., unstated tonnage, Mennen Hall dormitory at Cornell University.

CENTRAL STATES

State of Ohio, 110 tons, highway bridge in Gallia County.

Crossville, Ill., 1000 tons, highway bridge.

State of Illinois, 1500 tons, highway bridges; Mississippi Valley Structural Steel Co., low bidder.

State of Illinois, 900 tons, highway bridge; McClintic Marshall Corpn., low bidder.

Chicago, 2000 tons, Woodrow Wilson High School; Duffin Iron Works, low bidder.

Rock Island, Ill., 320 tons, sheet piling for Mississippi River lock and dam; bids to be opened Dec. 17.

Rock Island, 1578 tons, for Mississippi River lock and dam, bids open Dec. 17.

White County, Ill., 800 tons, highway bridge.

Green Bay, Wis., 275 tons, Monroe Avenue bascule span; bids close Dec. 8.

Milwaukee, 250 tons, Nurses' Home.

Alma, Wis., 1618 tons, sheet piling for Mississippi River lock and dam, bids open Dec. 17.

State of Minnesota, 750 tons, five highway bridges.

Missouri Pacific Railroad, 200 tons, beam spans.

Niles, Ohio, 200 tons, municipal bridge.

WESTERN STATES

State of Idaho, 200 tons, Federal highway bridge in Payette National Forest.

State of Washington, 2500 tons, bridges at Raymond, Sylvan, Stanwood and Skyhomish River.

Oregon City, Ore., 1000 tons, highway bridge in Bebe County.

FABRICATED PLATE

AWARDS

Chicago, 3250 tons, tunnel liner plates for sanitary district, to Commercial Shearing & Stamping Co. and Truscon Steel Co.

Cincinnati, 235 tons, two barges for United States Engineer, to McClintic-Marshall Corpn.

Long Beach, Cal., 1770 tons, six reservoir tanks, to Western Pipe & Steel Co.

Tacoma, Wash., 475 tons, Hood Street station pipe lines, to Birchfield Boiler Co.

Midland, Mich., 300 tons, oil tank, to Chicago Bridge & Iron Works.

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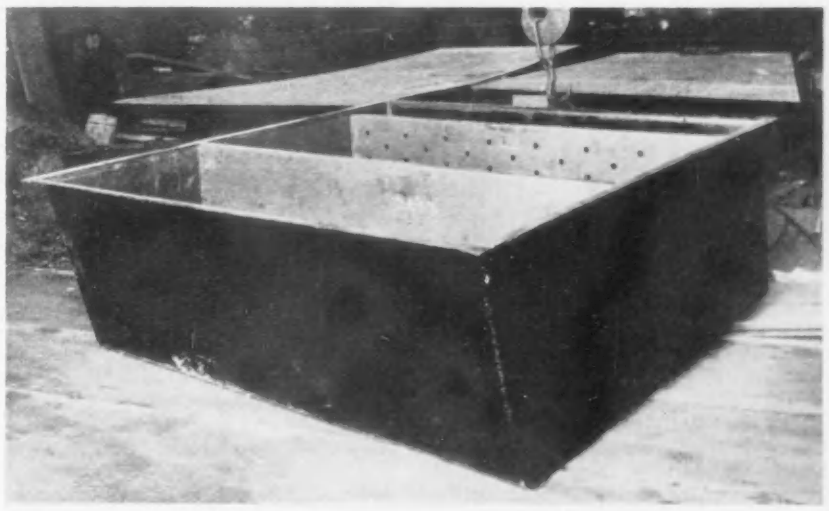
Nickel-Clad Plates Made in Range of Coatings

Nickel-clad steel plates, developed early this year by the Lukens Steel Co., Coatesville, Pa., in cooperation with the International Nickel Co., are being used in the chemical and allied industries where strength and resistance to corrosion are factors in equipment. The tank illustrated was fabricated by the James Russell Boiler Works, Dorchester, Mass., for a large textile finishing plant in Massachusetts, and is of all-welded construction, formed with 3/16-in., 10 per cent nickel-clad steel plates, with Monel metal baffles and partitions. The first nickel-clad plates rolled by the Lukens Steel Co. had a 10 per cent coating of nickel, but the range of qualities has since been extended and now includes plates 3/16-in. and heavier, with nickel surfaces contributing 12½, 15, 17½ and 20 per cent of the total thickness.



American Foundrymen to Meet in New Philadelphia Auditorium

THE thirty-sixth annual convention and exhibit of the American Foundrymen's Association will be held in Philadelphia on May 2 to 6, 1932. All convention and exhibit activities will be centered in the new Municipal Convention Hall, Thirty-fourth Street and Vintage Avenue, one of the most completely furnished and equipped convention halls in the country.

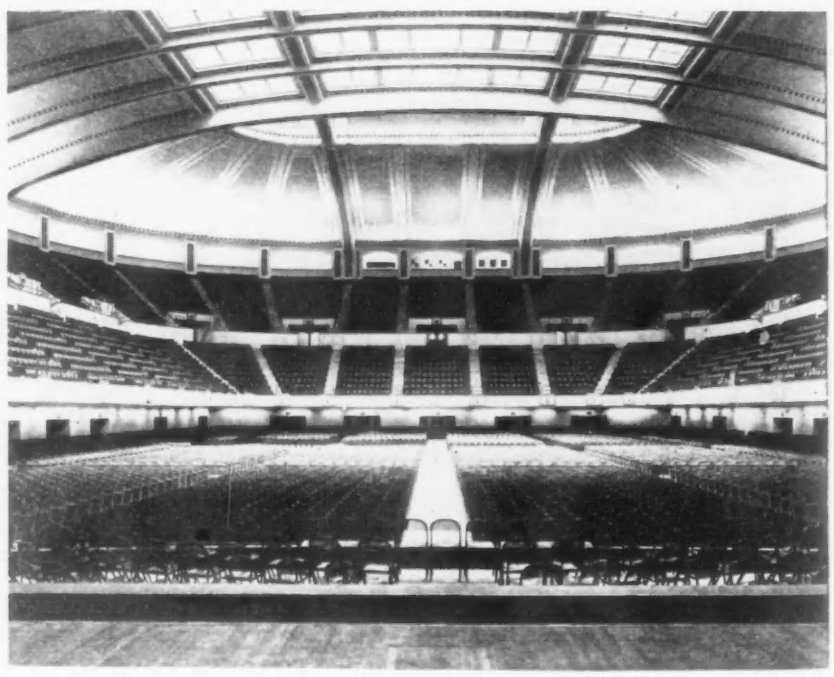
The main meeting rooms include the ballroom, with a seating capacity of 1300; the ballroom extension, seating 300; ballroom balcony, 350; lobby lounge, 350; and restaurant extension, 350. All these rooms can be served from the main dining hall kitchen, which is as completely equipped as any first-class hotel or club kitchen. The main convention hall restaurant is located directly below the lobby at the end of the exhibition hall.

For exhibit purposes two large, well-lighted and well-ventilated halls are available in the new convention building. These halls are the arena or auditorium, and the exhibition hall proper. Complete power facilities are available, including provision for both alternating and direct current, gas, compressed air, hot and cold water, and live steam.

The arena, having a seating capacity of 13,200, is in the form of an amphitheater, with a height of 88 ft. from floor to ceiling and without supporting columns of any kind. The arena stage, which is 116 ft. wide by 56 ft. deep, can either be used for additional exhibits, or converted into a meeting room by lowering the steel-asbestos fire curtain with which it is provided.

The exhibition hall, over-all dimensions of which are 146 by 250 ft., is on the lower floor and adjacent to the main convention hall restaurant. Handling of freight and materials in and out of the convention hall is provided for by a siding of the Pennsylvania Railroad which enters the building itself alongside a receiving platform, all under cover.

New Philadelphia convention hall, where American Foundrymen's Association will meet in 1932, is one of the largest and best equipped in the country.



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Classes for Unemployed

Classes in the engineering school of Columbia University have been opened without fee to unemployed professional engineers. Applicants must secure a certificate from the Engineers' Unemployment Committee, 29 West Thirty-ninth Street, New York, which is endeavoring to find work for approximately 2500 unemployed engineers in the metropolitan district. The principal purpose for opening the classes is to preserve the morale of these skilled men during a period of enforced idleness.

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Two 15-ton electric bulkhead electric cranes and one 30-ton electric locomotive crane will be required for the lock and dam to be erected by the Government on the Mississippi River at Rock Island, Ill. Bids opened Dec. 17.

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Niagara Falls Smelting & Refining Corpn., 2208 Elmwood Avenue, Buffalo, has completed a new chemical and physical laboratory and research department, devoted exclusively to metals and alloys.

British Trade Improves But Continental Unemployment Is Increasing

(*By Cable*)

LONDON, ENGLAND, Nov. 30.

THE general business situation in the United Kingdom is improving slowly and unemployment is decreasing. Certain sections of the iron and steel industry, however, are disappointed that a tariff has not yet been imposed, but still believe that the Government will take action soon.

As a result of the diversion of orders for semi-finished steel from Continental to British suppliers, demand for pig iron has increased, and output of certain furnaces has been enlarged despite substantial stocks on yards.

Export steel business is dull except for certain special orders from Canada. Mills rolling heavy products are still operating part time, but expect renewed activity in steel for shipbuilding, based on recent new ship contracts.

Business conditions on the Continent are growing worse and unemployment is increasing. An exception is the United Steel Works in Germany, which reports improved operations following orders for rails from the German railroads.

Continental sales of steel to British consumers have almost ceased as a result of depreciation of the pound sterling. At the same time the prices of Continental mills quoted in gold pounds sterling are easier, as works are in need of tonnage to continue operating.

With French and Belgian steel mills adopting a more friendly attitude toward a central selling office for export, discussion of a Continental selling cartel for semi-finished material and shapes has been revived. The German Pig Iron Syndicate has been renewed to Dec. 31, 1934.

Welsh tin plate mills are booking but little new business, but are quoting on important export inquiries, suggesting that consumers are more inclined to cover their requirements. While second hands are accepting tin plate business at 13s. 6d. ($2.40) per base box, f.o.b. works port, many mills are quoting a minimum of 13s. 9d. ($2.45) f.o.b. port.

Tin plate makers who buy their steel in the open market are petitioning the Government not to introduce a tariff on sheets and sheet bars.

Soviet Union output in October was 440,000 tons of pig iron, 470,000 tons of open-hearth steel ingots, and 375,000 tons of rolled steel products.

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British Test New Steel Railroad Tie

LONDON, ENGLAND, Nov. 23.—A new type of steel railroad tie is being tried out on the main line of the Great Western Railway. A chair for holding the rail is pressed in as an integral part of the tie, which is of rolled steel. No bolts and nuts are used, and the tie, which is proving satisfactory in service, is claimed to be cheaper both in initial cost and maintenance.

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Nine-Year Research on Springs Published

LONDON, ENGLAND, Nov. 23.— The complete report covering nine years' study by the springs research committee of the British Department of Scientific and Industrial Research has just been issued. The most important single result of the work was the discovery that, while spring steels can be treated to give high intrinsic properties, these properties are not obtained in spring materials as ordinarily manufactured, because surface weaknesses are developed from heat treatment. A separate investigation has suggested a method by which these weaknesses can be prevented.

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Nickel-Clad Plates Made by Japanese Mill

YOKOHAMA, JAPAN, Nov. 4.— The plate mill at the Kawasaki Dockyard Co., Kobe, is experimenting with the manufacture of nickel-clad plates for use in contact with acids and alkalis. As a result of these studies the company is about ready to offer steel plates clad with nickel and other materials for use by Japanese fabricators.

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Japanese Sellers Claim Indian Iron Is "Dumped"

YOKOHAMA, JAPAN, Nov. 4.—Japanese pig iron producers, who are seeking to reduce the volume of imports of pig iron from India, are now suggesting to the Government that it is being sold in violation of anti-dumping legislation. They claim that, although the price is 30 rupees ($8.35) a ton, Japanese port, the quotation in India is about 65 rupees ($18.07)) a ton.

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New Mills Join European Wire Rod Cartel

HAMBURG, GERMANY, Nov. 23.—Two important Continental producers of wire rods, with a combined annual capacity of 60,000 tons, have become members of the Continental Wire Rod Cartel. This addition to its membership is expected to strengthen the cartel's control of the market considerably.

British and Continental European Export Prices f.o.b. United Kingdom and Continental Ports

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton, £ at $3.55

Ferromanganese, export	£9	0s.				$31.95		
Billets, open-hearth	5	7½	to	£5	12½s.	19.08	to	$19.97
Black sheets, Japanese specifications	9	15	to	10	0	34.21	to	35.50
Tin plate, per base box	0	13¾	to	0	14¼	2.45	to	2.53
						Cents a Lb.		
Steel bars, open-hearth	7	17½	to	8	7½	1.25	to	1.32
Beams, open-hearth	7	7½	to	7	17½	1.16	to	1.25
Channels, open-hearth	7	12½	to	8	2½	1.21	to	1.29
Angles, open-hearth	7	7½	to	7	17½	1.16	to	1.25
Black sheets, No. 24 gage	8	5	to	8	10	1.31	to	1.34
Galvanized sheets, No. 24 gage	9	0				1.43		

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2	12s.				$12.65		
Wire rods, No. 5 B.W.G.	5	5				25.51		
Black sheets, No. 31 gage, Japanese	11	5				54.68		
						Cents a Lb.		
Steel bars, merchant	2	17				0.62		
Beams, Thomas	2	17½				0.62		
Angles, Thomas, 4-in. and larger	2	19				0.65		
Hoops and strip steel over 6-in. base	3	15				0.83		
Wire, plain, No. 8	5	0	to	£5	1¼s.	1.09	to	1.10
Wire, barbed, 4-pt., No. 10, B.W.G.	8	10				1.87		

Automobile Companies Buy Machine Tools

FORD and Chrysler Business Outstanding in an Otherwise Dull Market — Tools Ordered for New York Subway

AUTOMOBILE business is the bright spot of the week in the machine tool markets. The Ford Motor Co. has placed orders for some grinding equipment and is expected to buy between 25 and 30 milling machines. The Chrysler Corpn. has also ordered a fair amount of new equipment.

Formal orders have been distributed by Montgomery & Co., New York, general contractors for the equipment for new subway repair shops in New York. A large wheel lathe and some other expensive tools were included. Purchases amount to about $200,000.

In general, however, machine tool business has not improved. Very few of the inquiries recently received have been acted upon, and the trade does not look for much to be done until the new year.

Some sellers of shop equipment report that November sales were slightly ahead of those of October, but it is not certain that the improvement was sufficiently widespread to lift the average of November business above that of October.

The Hercules Motor Co., Canton, Ohio, which recently inquired for 42 used machines, is expected to buy only about half that number.

New York

There has been no marked change in the machine tool situation, although some dealers booked slightly more business in November than in October, which was generally a very poor month. Montgomery & Co., New York, who have the general contract to supply about $200,000 worth of shop equipment for subway repair shops in New York, have placed formal orders for some of the tools through local dealers.

Chicago

Here and there a machine tool buyer indicates interest, but usually purchases are not contemplated until 1932. Demand for cutters, drills and the like remain relatively active and several dealers report an increase in catalog inquiries. More used tools are changing hands, but buyers are shopping carefully and prices are low. The Studebaker Corpn., South Bend, Ind., has decided to rebuild a crank shaft line for the Rockne car and therefore will not buy new equipment.

Cincinnati

Bookings of one or two lathe manufacturers were larger than those in the preceding week. Demand for heavy tools, however, is unchanged. Two crankshaft lathes were bought by an automobile manufacturer; other orders were for single light tools of standard types. Inquiry has receded. Plant operations remain at about 30 per cent of capacity.

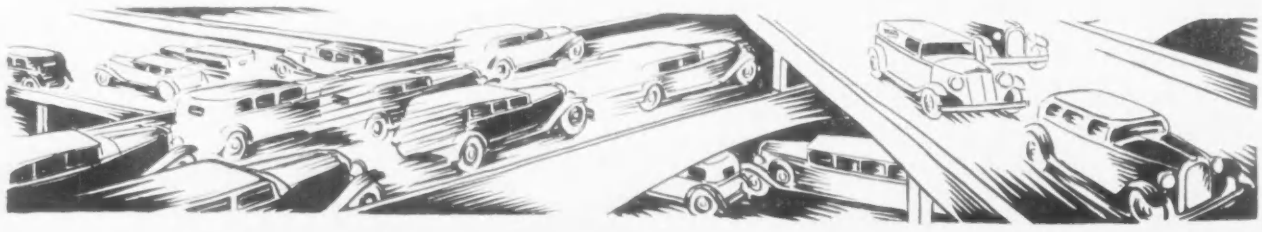
Cleveland

The recent improvement in machine tool inquiry was not reflected in any gain in sales the past week. While orders are still scarce, the volume of business in November showed a slight gain over that in October. The outlook for December is not regarded as very promising, as the trade does not expect that much of the pending business will be placed until after the new year.

While there is considerable replacement equipment to be bought in this territory, it is not likely that much of this will be purchased until general conditions improve. The Hercules Motor Co., Canton, Ohio, which recently inquired for 42 used machines, has cut its list to about half.

New England

Few sales were made the past week, but correspondence between dealers and prospective buyers increased. The trade is more optimistic regarding business early in 1932 than it has been in many months. One large local dealer has made an analysis of its business since organization and finds that 1931 sales are about 38 per cent less than for any year in its history.



A 25th Anniversary— and a New Hack Saw

FOR a quarter century, Victor has stood for increasingly better values in hack saw blades that are used by industry.

Until recently the need has been for better hack saws —almost regardless of price. In power blades, for instance, we produce a blade of high tungsten content that meets all requirements—except the price, and a type of blade that costs industry more than a million dollars a year.

For some time we have believed that a new combination of metals could produce the results required in heavy-duty service—at a lower cost.

The answer we have found in Molybdenum—an American mined metal, used extensively by the Government, and fast coming into commercial use particularly where high resistance values are required.

Victor Hack Saw Blades, made of Molybdenum steel under a special Victor process, will do anything any hack saw blades can do—and yet because the materials are less expensive, we are now able to market a product of the same high quality as our high tungsten content blades *at about one-half their cost.*

We are confident that any user of heavy-duty saws who tries a dozen of these blades will thereafter secure his share of the $500,000 annual saving which the Victor Molybdenum Heavy Duty, Extra Value Blades are bringing to industry.

Victor

Richard D. Clemson

PRESIDENT

VICTOR SAW WORKS, Inc.

Middletown, N. Y.

Manufacturer of Tungsten "All Hard", "Special Flexible" Hand, "Light" and "Heavy" Power, "High Speed" Hand and Power Blades, Molybdenum "Heavy Duty, Extra Value" Power Blades, and Band Saws.

1398

NEW YORK

New York Central Railroad Co., 466 Lexington Avenue, New York, is completing revised plans for freight terminal to occupy four blocks bounded by Washington, Clarkson, Spring and West Streets. Cost about $12,000,000 with equipment. Superstructure is scheduled to begin in January.

Continental Can Co., 1 Pershing Square, New York, purchased plant and business of Gordon Can Co., Omaha, Neb., manufacturer of tin cans, etc., for branch plant.

Board of Education, Park Avenue and Fifty-ninth Street, New York, filed plans for five-story school, 218 x 375 ft., in Bronx, to cost $4,400,000. Manual training department is planned. Thompson, Holmes & Converse and Charles B. Meyers, 101 Park Avenue, architects.

Superintendent of Lighthouses, Third District, Staten Island, N. Y., asks bids until Dec. 21 for 16,000 lb. iron castings for six months' period.

Muller Paper Goods Co., 2350 Linden Street, Brooklyn, operating paper converting mill, plans early award of general contract for three-story addition and improvements in present plant. Cost about $80,000 with equipment. H. Bruckner, 2424 Myrtle Avenue, architect.

I. & J. Mendes Mfg. Co., Inc., Brooklyn, organized by Isaac and Bernard Mendes, 129 Seeley Street, and Joseph Mendes, 1422 Fifty-fifth Street, to manufacture precision instruments, thermometers, etc.

Queens Borough Gas & Electric Corpn., 1610 Central Avenue, Long Island City, N. Y., has plans for three-story and basement equipment storage and distributing plant, 35 x 42 ft. Cost over $50,000 with equipment. E. L. Phillips & Co., 50 Church Street, New York, engineers.

Lang & Brant, Inc., New York, organized by Morris Lang, 610 West 163rd Street, Bronx, and associates, to manufacture tools and mechanical equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 15 for one motor-driven cutter and tool grinder and one motor-driven cutter, reamer and drill grinder for New York yard.

New York Central Electric Corpn., 61 Broadway, New York, secured permission to build artificial gas plant and system at Sparta, N. Y. Cost over $90,000 with equipment. Franchise calls for completion within 12 months.

Board of Education, Administration Building, Jersey City, N. J., plans manual training department in four-story senior high school. Cost $2,000,000. John T. Rowland, Jr., 30 Journal Square, architect.

New Jersey Bell Telephone Co., 540 Broad Street, Newark, will soon take bids on general contract through Voorhees, Gmelin & Walker, 101 Park Avenue, New York, architects, for six-story equipment storage and distributing plant, 135 x 265 ft., including automobile service, repair and garage unit. Cost over $400,000 with equipment.

Central Metal Mfg. Co., Newark, care of Solomon Golatzky, 207 Market Street, attorney, organized by John Pelucha and Carl Barbato, Newark, to manufacture metal goods.

Star Electric Motor Co., 140 Miller Street, Newark, manufacturer of electric motors and parts, is taking bids on general contract until Dec. 7 for one-story plant, 160 x 220 ft. Cost over $65,000 with equipment. J. Di Stasio & Co., 136 Liberty Street, New York, architects.

Board of Trustees, Englewood School for Boys, Englewood, N. J., has plans for two-story and basement school. Cost $150,000 with manual training and other equipment. Lawrence C. Light, 4 Dean Street, architect.

Commanding Officer, Picatinny Arsenal, near Dover, N. J., asks bids until Dec. 7 for railroad switches, cross-over equipment, etc.

Tung Sol Lamp Works, Inc., 95 Eighth Avenue, Newark, manufacturer of radio lamps and equipment, has plans for four-story factory, 100 x 150 ft. Cost over $175,000 with equipment. Fougner Gautier, 103 Park Avenue, New York, architects.

Board of Education, 31 Green Street, Newark, N. J., asks bids until Dec. 9 for electric grinders, sheet metal tools, air compressors and pumps, electrical supplies, steel lockers and other equipment for manual training schools. R. D. Argue, secretary.

Board of Education, Essex County Vocational Schools, Hall of Records, Newark, asks bids until Dec. 9 for equipment and supplies for aviation department, Boys' Vocational School, Bloomfield, N. J. Robert O. Beebe, director.

Hoosick Electric Specialty Co., Inc., Hoosick Falls, N. Y., organized by Robert Dewar, Hoosick Falls, and associates to manufacture electrical equipment. William G. Viall, 75 Washington Street, Bloomfield, N. J., is interested.

Brunner Mfg. Co., Utica, N. Y., manufacturer of air compressors, is arranging department for manufacture of electric refrigerating equipment.

NEW ENGLAND

Hygrade Lamp Division of Hygrade-Sylvania Corpn., Salem, Mass., manufacturer of radio tubes, electric lamps, etc., has purchased adjoining buildings, making total floor space of 231,000 sq. ft., for expansion, including storage and distribution.

American Thread Co., Kerr Street, Fall River, Mass., has plans for extensions and improvements in power plant at textile mill. Cost over $45,000 with equipment.

Guetti Mfg. Corpn., Leicester, Mass., organized by Fred R. Coops, 489 Oak Street, Shrewsbury, Mass., and associates, to manufacture pressed metal products. Lorenzo S. Guetti, Leicester, president.

New England Power Association, Worcester, Mass., has purchased steam-operated electric generating plant of United Electric Railways Co., Providence, R. I., at $2,150,000. Extensions are planned, including transmission lines.

Norwood Auto Radiator & Body Co., South Norwood, Mass., recently organized to manufacture automobile bodies, radiators, etc., with repair department, has arranged for plant at 102 Washington Street, operations to begin at once.

National Automatic Corpn., Boston, organized by Marion L. Dray, 85 Harvard Street, Hyde Park, and associates, to manufacture machinery and parts. Robert S. Ingram, president.

J. L. Hammett Co., 290 Main Street, Cambridge, Mass., manufacturer of school equipment and supplies, let general contract to J. M. & C. J. Buckley Co., 183 Essex Street, Boston, for two-story addition and improvements in present factory. Cost about $45,000 with equipment.

Board of Education, Cambridge, Mass., M. E. Fitzgerald, superintendent of schools, soon takes bids on general contract for multi-story addition to Rindge Technical High School. Cost $1,500,000 with equipment. Ralph Harrington, 60 Batterymarch Street, Boston, architect.

New Haven Clock Co., New Haven, Conn., is running on five-day week schedule giving employment to 1000 persons.

Menderth, Inc., Byron, Me., will make plant alterations costing $50,000. A compressor, drills and miscellaneous equipment will be purchased.

Union Metal Works, Chelsea, Mass., will soon start work on a copper and brass working shop addition.

L. T. Wood Co., South Manchester, Conn., will purchase ice making and other equipment for a new plant.

Lawrence Factories, Inc., Lawrence, Mass., will be taken over by Pilot Radio & Tube Corpn., and new equipment will be purchased.

George H. Griswold Machine Co., New Haven, manufacturer of machinery, has removed from Bradley and William Streets to new and larger plant at 85 Wallace Street.

PHILADELPHIA

Shuster Auto Body Co., 1540 Callowhill Street, Philadelphia, leased building at 1517-19 Vine Street, for plant.

Welding Engineers, Inc., 225 South Fifteenth Street, Philadelphia, leased one-story building on Collins Street, and will remodel for new plant.

William Romm, 1543 Bellefield Avenue, Philadelphia, operating sheet metal working and automobile body repair works, has leased building at 1320 Girard Avenue for new plant.

City Sign Service, Inc., Philadelphia, organized by David Kalbs, 5907 Addison Street, and Maurice E. Entliss, 4925 Ella Street, to manufacture electrical signs and displays.

Department of City Transit, City Hall Annex, Philadelphia, asks bids until Dec. 18 for miscellaneous equipment for Ridge Avenue and Eighth Street subway system.

City Commission, City Hall, Trenton, N. J., asked bids on general contract for one-story freight terminal and distributing building at new municipal terminal, Delaware River, 100 x 300 ft., to include installation of crane, loading and other handling equipment. Cost about $100,000 with equipment. John W. Thompson, East State and Clinton Streets, consulting engineer.

E. J. Quigley, State Purchase Commissioner, State House, Trenton, N. J., asks bids until Dec. 7 for quantity of cast iron sign posts and snow plows; until Dec. 8 for motorcycle parts.

Philadelphia Steam Co., Grays Ferry Avenue and Forty-ninth Street, Philadelphia, subsidiary of Philadelphia Electric Co., plans extensions in central steam distributing system, including pipe lines, etc., and generating facilities. Cost over $2,000,000 with equipment. United Engineers & Constructors, Inc., 112 North Broad Street, engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 15 for 990 storage batteries for Philadelphia Navy Yard.

Board of Education, Downingtown, Pa., plans manual training department in new junior high school, for which low bid on general contract was tendered by Yardley Construction Co., Yardley, Pa., at $110,367. Total cost about $160,000. John H. Mowere, Downingtown, architect.

Aircraft Control Corpn., 3246 Ludlow Street, Philadelphia, secured contract from Bureau of Aeronautics, United States Navy, for 300 airspeed indicators with operating range of 300 miles an hour., and will develop increased output.

Delaware Power & Light Co., Wilmington, Del., plans equipment and appliance repair shop in basement of new multi-story headquarters building. General contract let to United Engineers & Constructors, 112 North Broad Street, Philadelphia. Cost, entire unit, about $400,000. Brown & Whiteside, Inc., duPont Building, Wilmington, architects.

CHICAGO

Commonwealth Edison Co., 72 West Adams Street, Chicago, has been granted permission to sell 156,942 shares stock, to net $15,694,200, part of fund for extensions and improvements in power plants and system.

Minnesota Power & Light Co., 30 West Superior Street, Duluth, Minn., contemplates second unit at power plant in West Duluth, work to begin next year. Cost over $2,000,000 with equipment.

Charleston Engineering & Mfg. Co., Chicago, organized by Peter P. and William P. Zommer, to take over and expand company of same name at 2035 Charleston Street, manufacturer of machinery and parts.

Common Council, Emmons, Minn., approved plans for municipal electric light and power plant. Cost about $100,000 with equipment.

Public Service Co. of Colorado, Denver, is disposing of bond issue of $11,000,000, part of fund to be used for expansion and improvements in plants and system, including natural gas pipe lines. Company recently acquired Colorado-Wyoming Gas Co., operating natural gas line between Denver and Cheyenne, Wyo., and interest in Colorado Interstate Gas Co., with natural gas line between Denver and Amarillo, Tex., fields.

Common Council, Villisca, Iowa, called special election on Dec. 7 to vote bonds for $150,000 for municipal electric light and power plant.

Elra Mfg. Co., Chicago, formed with capital of $100,000 and 50,000 shares stock, no par value, to take over and expand company of same name at 176 West Adams Street, manufacturer of electric heating equipment and devices. John D. Rogers and Werner H. Bothe head new company.

City Council, Aberdeen, S. D., is having estimates of cost made for municipal electric power plant and system. Bemis Co., 105 West Adams Street, Chicago, engineer.

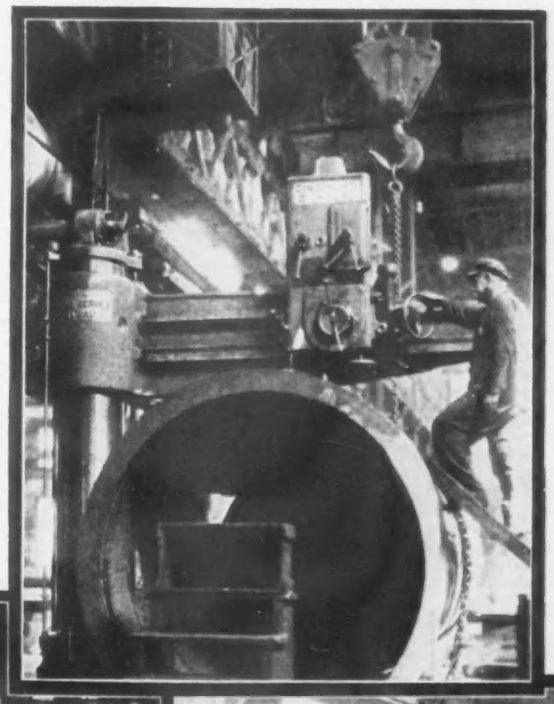
Howell Machine Works, Inc., 108 North Jefferson Street, Chicago, has changed its name to Howell-Maisch Mfg. Co., to manufacture machine products.

International Harvester Co. is transferring production of farm and industrial tractors, formerly conducted at Chicago tractor works, to Milwaukee plant, leaving only Trac-Tractors, or caterpillar type production, at Chicago. Under this arrangement heavy-type wheel tractors will be concentrated in Milwaukee, Farmall tractors in Rock Island and Chicago tractor works will produce only track laying type. Operations at Chicago have been stepped up to four days a week.

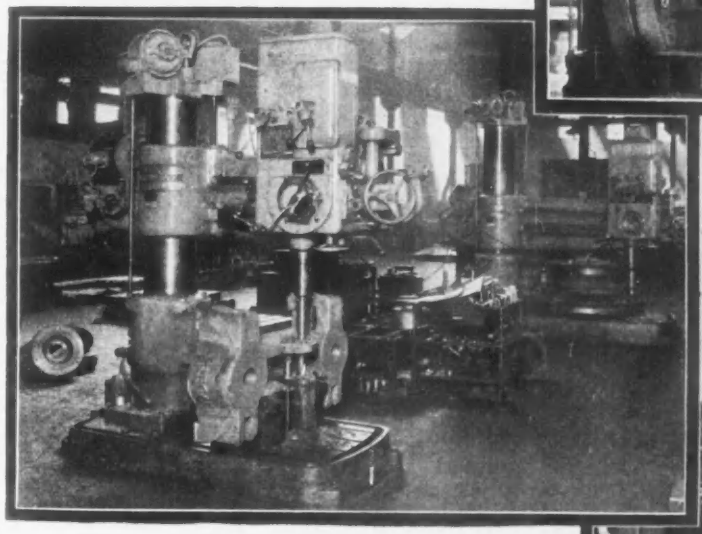
REAL PERFORMANCE

Performance, year after year, in leading plants everywhere, establishes the real value of the SUPER-SERVICE Radial. Users who accurately check the cost per hole are proving that SUPER-SERVICE Radials not only drill more holes per hour but also more holes per dollar invested. Savings are being made with this machine in plants where drilling cost reduction was thought impossible. Write for literature showing the accomplishments of others — cost cutting accomplishments which you can probably duplicate. Now is the time to investigate and plan for faster drilling equipment.

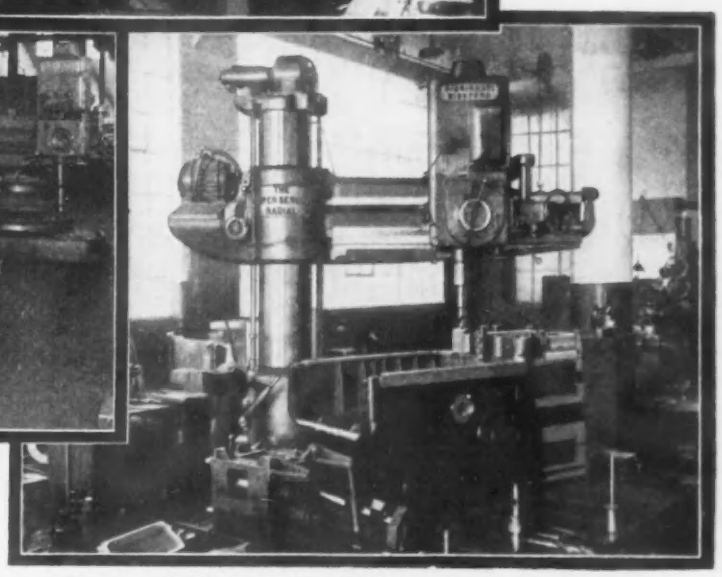
The Cincinnati Bickford Tool Co.
Oakley, Cincinnati, Ohio



Courtesy of The Griscom-Russell Co., Inc., Massillon, O.



Courtesy of
The Morgan Construction Co.
Worcester, Mass.



Courtesy of The Blanchard Machine Co., Cambridge, Mass.

We are ready to prove that

SUPER-SERVICE RADIALS PRODUCE *FASTER!..*

SOUTH ATLANTIC

Treasury Department, Washington, authorized plans for multi-story storage and distributing building for appraisers' stores at Baltimore, with loading and other equipment. Cost $1,000,000. William F. Stone, Jr., 2612 North Charles Street; R. E. Lee Taylor and D. K. Este Fisher, Baltimore Trust Building, architects.

Domestic Utilities, Garrison Boulevard and Western Maryland Railroad, Baltimore, let contract to Maryland Metal Building Co., Race and McComas Streets, for rebuilding refrigerating equipment plant recently destroyed by fire, one-story, 50 x 100 ft.

Chief of Engineers, United States Army, Washington, asks bids until Dec. 8 for one 16-ton gasoline engine-driven locomotive.

Board of District Commissioners, District Building, Washington, asks bids until Dec. 8 for two municipal refuse incinerator buildings, 100 x 148 ft., and 70 x 100 ft., with machinery, radial brick stack, etc.

American Stores Co., 242 North Nineteenth Street, Philadelphia, wholesale grocer, let general contract to Turner Construction Co., Architects' Building, for two-story and basement storage and distributing plant at Baltimore. Cost about $125,000 with equipment.

Procurement Division, Veterans' Administration, Washington, asks bids until Dec. 7 for one hand-operated paper-cutting machine.

Charlottesville Woolen Mills, Charlottesville, Va., plans installation of electric motors, controls, conveying and other equipment in plant addition. Cost about $100,000. Lockwood Greene Engineers, Inc., 9 West Third Street, Charlotte, N. C., architect and engineer.

Baltimore Paint & Color Co., 148 South Calverton Road, Baltimore, has plans for two one-story additions, 35 x 100 ft., and 25 x 28 ft. Cost over $35,000 with equipment. Morris Zimlin, 1924 Granby Street, engineer.

Swift & Co., Union Stock Yards, Chicago, plans cold storage and distributing plant at Greensboro, N. C., on site recently purchased. Cost about $50,000 with equipment.

Asa G. Candler, Inc., Candler Building, Atlanta, Ga., let general contract to Carr Construction Co., Atlanta, for one-story automobile service, repair and garage building, 68 x 105 ft.

Southern Public Utilities, Inc., Charlotte, N. C., is negotiating for acquisition of municipal electric light and power plant at Shelby, N. C., at $1,100,000. Extensions are planned, including transmission lines.

Crane Co., Savannah, Ga., leased 7500 sq. ft. adjoining plant and contemplates storage and distributing plant. Cost over $40,000 with equipment. Headquarters at Chicago.

BUFFALO

Commissioner of Correction, State Office Building, Albany, N. Y., plans new shop at State reformatory, Elmira, N. Y. Cost $75,000 with equipment. Work to be carried out in connection with modernization program costing $1,300,000. Dr. Frank L. Christian, Elmira, superintendent.

John L. and Reginald Wells, Hornell, N. Y., and associates have purchased plant and assets of A. J. Deer Co., Hornell, manufacturer of meat choppers and cutters, coffee grinders, etc., in receivership. New owners will reorganize and resume operations.

Dobel Mfg. & Plating Co., Buffalo, organized by Nicholas J. Dobel, 691 West Avenue, and associates, to operate metal plating works and manufacture line of metal products.

Elmira Water, Light & Railroad Co., Elmira, N. Y., has applied for permission to make extensions in artificial gas plants and system at Elmira, Erwin, Chemung, Baldwin, Ashland and other points.

Hypochlorite Products Corpn., Tonawanda, N. Y., recently organized, is establishing plant for manufacture of industrial chemicals.

Jamestown Iron Works, Jamestown, N. Y., operated by Thomas Maher & Son, has completed one-story addition for iron foundry and will soon place in service. Cost over $40,000 with equipment.

GULF STATES

Tex-York Utilities Corpn., affiliated with Courtland Palmer Co., New Orleans, purchased refinery of Sinclair Oil Co. of Louisiana at Meraux, La. Plans are under way for new unit to increase daily capacity from 30,000 to 50,000 bbl. gasoline. Cost over $300,000 with equipment. Purchasing company also contemplates pipe line to cost about $5,000,000.

Telogee Power Co., care of Guy Winthrop, Tallahassee, Fla., plans power plant at Medart, near Wakulla, Fla., with Diesel engine-generator installation. Wakulla County Chamber of Commerce, Wakulla, is interested in project.

Super Bond Clay Co., 1007 Lighton Street, Anniston, Ala., recently organized, acquired plant of Sialco, Inc., Eastaboga, Ala., for production of high-temperature cements, refractories, etc. J. Ellis Harvey is manager.

Gladewater Refining Co., Gladewater, Tex., contemplates gasoline refinery in east Texas oilfield district, with daily capacity of 4,000,000 cu. ft. Cost over $100,000 with machinery.

Longview Independent School District, Longview, Tex., contemplates installation of manual training equipment in three-story senior high school. Bids on general contract to be called in January. Cost about $275,000. Mark Lemmon, Tower Petroleum Building, Dallas, Tex., architect.

Octane Oil Refining Co., Baird, Tex., is considering new oil refinery about five miles from city, to have daily capacity of 1500 bbl. Cost over $150,000 with equipment and pipe lines.

City Council, Burkburnett, Tex., called special election to vote bonds for $120,000 for municipal electric light and power plant, and distributing system.

Construction Service, Veterans' Bureau, Washington, asks bids until Jan. 5 for veterans' administration unit and utilities at St. Petersburg, Fla., including boiler plant equipment, steel water tank and tower, refrigerating and ice-making plant, steam and electric distribution systems.

Diamond Refining Co., Overton, Tex., acquired oil refinery of Rusk Refining Co., recently held by Butler & Calhoun Co. Capacity will be developed for handling 300 bbl. crude oil daily.

Liquid Carbonic Corpn., Dallas, Tex., plans addition to carbonic gas plant for manufacture of dry ice. Cost over $40,000 with machinery. T. H. Teal, manager. Headquarters, 3100 South Kedzie Avenue, Chicago.

MILWAUKEE

Standard Steel Spring Co., Coraopolis, Pa., has purchased one building of Harvey Spring & Forging Co., Racine, Wis., and is making alterations for manufacture of automobile springs for original equipment. Harvey company will continue manufacture of replacement springs, forgings, wagon hardware, etc. Donald Gleeson is manager of new Standard production unit.

Superior Steel Products Co., 325 West McKinley Avenue, Milwaukee, formerly Superior Tool & Die Co., is placing into quantity production new type of die set cut from steel plate, with welded shanks and flanges, instead of employing gray iron castings. Plant is operating 23 hr. a day, six days a week as result of increase in demand.

Green Bay & Western Railway, Green Bay, Wis., placed contract with Truscon Steel Co., Youngstown, Ohio, for one-story freight house, 60 x 200 ft., costing about $40,000 with equipment.

George A. Kissel and Thomas L. Davison, receivers for Kissel Motor Car Co., Hartford, Wis., have announced public auction of properties originally set for Oct. 27 and then postponed to Nov. 23, will be held Dec. 21.

Four Wheel Drive Auto Co., Clintonville, Wis., has recently added another shift to take care of increased demand for its trucks.

PITTSBURGH

Taylor-Paramount Rubber Corpn., Jeannette, Pa., organized by Avra N. Pershing, Jr., Greensburg, Pa., and John L. Mollison, Scottdale, Pa., to manufacture mechanical rubber products.

United States Engineer Office, Pittsburgh, asks bids until Dec. 21 for constructing dam No. 4, Monongahela River.

Board of Education, Administration Building, Pittsburgh, contemplates manual training department in new high school on West Liberty Street. Cost over $500,000. Bids to be asked on general contract this month. R. M. Trimble, Ferguson Building, architect.

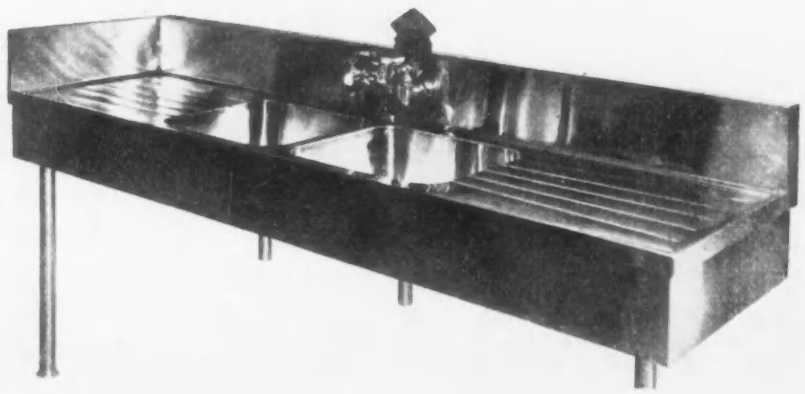
C. R. Cummins, Williamsport, Pa., operating Station WRAK, has applied for permission to build broadcasting stations, with power stations, etc., at Morgantown, Moundsville, Bluefield and other points in West Virginia.

International Refineries, Inc., Oil City, Pa., organized by J. Villard Frampton and James H. Courtney, Oil City, to operate oil refinery and compounding plant.

Westmoreland Products Co., New Castle, Pa., recently organized, has established plant for manufacture of iron oxide and kindred products, using waste materials from Shenango works of American Sheet & Tin Plate Co.

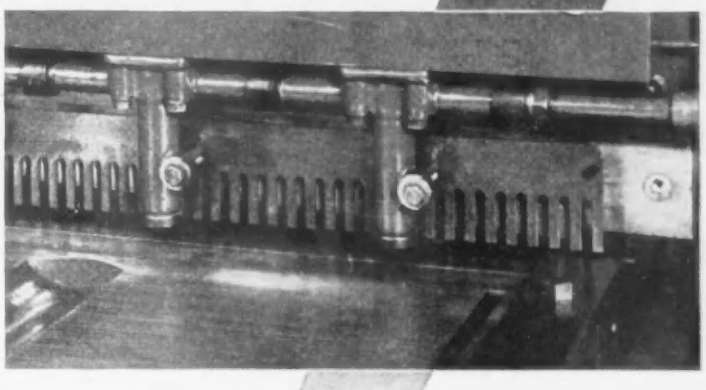
▲ ▲ ▲

RUSTLESS STEEL SINK MADE FOR RESTAURANTS



THIS completely rustless steel sink, exhibited at the recent Hotel Exposition by the Republic Steel Corpn., is being built for hotel and restaurant use by the Ames Mfg. Co., 1513 North Phillip Street, Philadelphia. The drain and protective ledge at the back are formed of No. 20 gage, Enduro KA2 sheets, over a wood foundation. Edges are all lap-seamed and soldered throughout with a composition developed for the purpose by the Ames company. Even the supporting legs are of chrome-nickel alloy steel tubing, electrically welded and furnished by Steel & Tubes, Inc.

CINCINNATI PUTS HYDRAULIC HOLDDOWNS ON SHEARS



Only the plungers move to clamp the sheet. The knife guard can be mounted in front of or behind the holddowns.

HERE is an All-Steel Squaring and Slitting Shear with hydraulic holddowns that clamp the sheet with heavy uniform pressure.

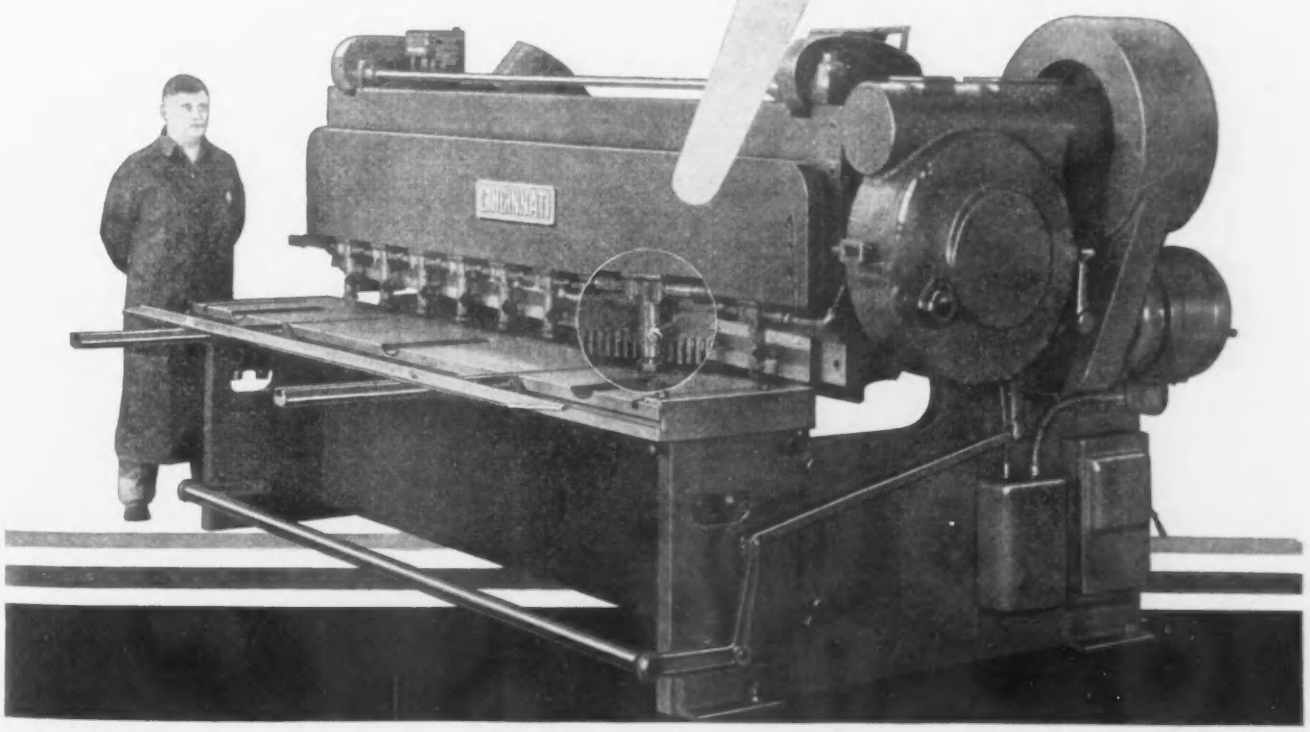
The plungers really hold the sheet, no creepage, no kick out, you'd think the sheet was pinned to the table . . . that means accuracy.

They are fast too. They start down, they hold the sheet while the knife cuts, they release when the knife is at the bottom, all in just a half a second . . . that's speed.

Imagine a dozen fast one-ton hydraulic presses right on the shear table and you've got it.

Read about this great advance in shearing speed and accuracy. Let us send you an illustrated catalog.

THE CINCINNATI SHAPER CO.
CINCINNATI, OHIO



Company will develop new process for production of copperas.

Standard Plate Glass Co., Butler, Pa., is increasing capacity at sheet glass plant, giving employment to more than 200 men on day and night shifts.

Detroit Wire Die Co. has recently established a manufacturing branch at McKeesport, Pa., on property of Firth Sterling Steel Co., for which it makes drawing and extrusion dies with nibs of Firthaloy sintered carbide.

CINCINNATI

Kroger Grocery & Baking Co., 35 East Seventh Street, Cincinnati, let general contract to Parkway Construction Co., Keith Building, for two-story addition to storage and distributing plant, 140 x 374 ft., and extensions and improvements in steam power house, with one and two-story dairy unit, 70 x 119 ft. Cost $150,000 with equipment. Farley Christy, company architect; C. R. Waggner, company engineer.

Contracting Officer, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 7 for 13 motor-driven drill presses, until Dec. 8 for about 10,000 lb. steel wire, until Dec. 14 for brass rods, brass tubing, bronze castings for bearings, copper tubing, copper wire, etc., and for quantity of seamless steel tubing.

Garage & Welding Supply Co., Columbus, Ohio, care of Wilbur R. Middendorf Co., 500 Nashoba Avenue, organized by Eugene W. Beeler and Benjamin A. Hagan, Columbus, to operate welding works.

Board of Trustees, Oberlin College, Oberlin, Ohio, plans new steam power plant for central heating service. Cost about $300,000 with equipment.

Southern Cold Storage Co., Cleveland, Tenn., plans rebuilding of ice and refrigerating plant recently destroyed by fire. Cost about $40,000 with machinery.

Louisiana Oil Refining Corpn., Shreveport, La., let contract to Fred J. Sexton, 191 Court Street, Memphis, Tenn., for oil storage and distributing unit, 60 x 120 ft., in connection with expansion at Memphis. Estes Mann, Cotton Exchange Building, Memphis, architect.

Finished Flooring Corpn., South Fifth Street, Nashville, Tenn., leased former plant of Tennessee Oak Flooring Co. for production of hardwood flooring.

Morris Thurman, 154-6 North Fifth Street, Columbus, Ohio, let contract to L. R. Moore, 2524 Sherwood Road, for one-story addition to machine shop.

Globe-Wernicke Co., Carthage Avenue, Cincinnati, manufacturer of steel filing cabinets, desks, etc., has increased production to full time with full operating force.

ST. LOUIS

Chromium Plating Co., Tulsa, Okla., leased building at 123 North Cincinnati Avenue for new chromium plating and metal rust-proofing works.

City Council, Ord, Neb., plans municipal electric light and power plant. Cost over $40,000 with equipment. Black & Veatch, Mutual Building, Kansas City, Mo., consulting engineers.

Philip Hickey, Forrest City, Ark., and associates have plans for one-story cottonseed oil mill, 90 x 200 ft., with crushing capacity of 150 tons daily. Cost about $30,000 with machinery.

Constructing Quartermaster, Fort Sill, Okla., asked bids on general contract for one-story hangar, 128 x 308 ft., with repair shop annex and boiler plant. Cost about $55,000 exclusive of equipment.

Union Electric Light & Power Co., Twelfth and Locust Streets, St. Louis, begins construction soon of high-tension transmission line from Osage River hydroelectric generating plant, about 46 miles from Jefferson City, Mo., to St. Louis. Cost about $1,000,000 with equipment. Stone & Webster Engineering Corpn., 49 Federal Street, Boston, engineer.

Kansas Pipe Line & Gas Co., Salina, Kan., will install natural gas distributing system at Seward, Claflin, Macksville, Miltonvale and other communities, totaling 39 miles. Cost over $100,000 with compressor station and equipment. Gas supply will be secured from line of Missouri Valley Pipe Line Co.

City Council, Durant, Okla., plans installation of electric-operated pumping machinery in connection with extensions and improvements in municipal waterworks. Election called for Dec. 8 to vote bonds.

Glendale Mining Co., Joplin, Mo., N. J. Andrew, head, has acquired Shirley mines, near Stotts City, Mo., and plans installation of air compressor, oil engines and other power equipment.

City Council, Lees Summit, Mo., plans special election after first of year to vote bonds for $40,000 for installation of electric light and power system. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., engineers.

Aeronautics Bureau, Department of Commerce, Washington, has plans for airways radio range station on 10-acre tract recently acquired near Springfield, Mo. Cost about $75,000 with equipment.

Common Council, Dixon, Mo., plans installation of electric-operated pumping machinery in connection with extensions and improvements in municipal waterworks. Cost about $45,000. Bond election will be held after Jan. 1. Western Engineering Co., Springfield, Mo., consulting engineer.

DETROIT

Department of Buildings, Michigan State College, East Lansing, Mich., asks bids until Dec. 10 for 1000-hp. boiler, underfeed stoker, pulverized fuel stoker, overfeed stoker and other equipment for power plant.

Superintendent of Lighthouses, Detroit, asks bids until Dec. 15 for 20 to 26 steel bodies for gas buoys, 6 ft. diameter.

Weber Specialty Co., Bay City, Mich., recently formed by Alvin H. Weber, treasurer of H. C. Weber Construction Co., Bay City, is arranging for plant for production of furnace regulators and kindred heating equipment.

Reo Motor Car Co., Lansing, Mich., will increase line of output with production of semi-trailers from 1½ to 4 tons capacity. Production of pleasure cars and small trucks to be continued as heretofore.

Board of Education, Battle Creek, Mich., plans installation of manual training department in multi-story high school for which bids on general contract will be asked soon. Cost about $500,000. Albert Kahn, Inc., Marquette Building, Detroit, architect and engineer.

F. L. Jacobs Co., 6901 East Lafayette Street, Detroit, manufacturer of metal tubing, etc., asked bids on general contract for one-story addition. Cost about $30,000 with equipment. Austin Co., General Motors Building, engineer.

AC Spark Plug Co., Flint, Mich., will increase production for new line of automotive products, including vacuum pumps, signal lights for large motor vehicles, and valve injectors.

General Manganese Corpn., 155 West Congress Street, Detroit, plans new leaching and concentrating mill at properties near Chamberlain, S. D., where mining operations have been under way. Cost over $250,000 with machinery.

Reynolds Spring Co., Jackson, Mich., manufacturer of automobile springs, etc., recalled about 200 men, making total force of 650 persons.

Great Lakes Electric Control Corpn., Monroe, Mich., organized by Henry C. Sisung, 27 East Lorain Street, and associates, to manufacture electrical equipment.

Norge Corpn., 7601 Central Street, Detroit, manufacturer of electric refrigerating equipment, will expend over $300,000 in expansion and modernization program at plant of subsidiary, Alaska Refrigerator Corpn., Muskegon, Mich. Electric refrigerator unit assembling will be removed from Detroit to Muskegon and capacity increased. Present working force of about 600 persons will be doubled.

CLEVELAND

Dornback Furnace Co., 10220 St. Clair Avenue, Cleveland, stoves and furnaces, contemplates one-story addition for storage and distribution.

Periscope Liquid Gauge Co., Cleveland, care of A. R. Johnson, Guardian Building, organized by Charles D. Benson and Richard T. Green, Cleveland, to manufacture gages, measures, etc.

Swan Rubber Co., Bucyrus, Ohio, will equip new department for production of brake lining for automotive and industrial service.

Department of Public Service, Cleveland, Rees H. Davis, director, plans establishment of new central repair and service plant for city-owned automobiles and trucks. A building will be erected or leased.

C. A. Carren, city manager, East Cleveland, Ohio, plans early call for bids for steel water tank for municipal water system. Cost over $20,000. M. W. Garnett, East Cleveland, engineer.

Willys-Overland Co., Toledo, Ohio, is increasing production of automobiles and trucks, and adding to working quota. Sales average 80 to 90 per cent in excess of same time last year.

Chevrolet Motor Ohio Co., 900 West Central Avenue, Toledo, Ohio, has resumed production following temporary curtailment, recalling about 1500 operatives for day and night shifts.

INDIANA

Illinois Carton & Label Co., 2601 North Crawford Avenue, Chicago, manufacturer of corrugated and other paper boxes and containers, asked bids on general contract for one-story plant, 130 x 200 ft., at Elkhart. Cost about $60,000 with equipment.

West Dodd Lightning Conductor Corpn., Goshen, organized by Amasa G. Hoovens, Goshen, to take over Goshen Lightning Rod Co., Goshen, and other companies. New company will concentrate production at Goshen for lightning rods, copper cables, etc. Erection of one-story brass foundry is contemplated. Earl R. Stotts and Edward G. Miller, Goshen, are interested.

Osborne Paper Co., 1012 South Adams Street, Marion, awarded general contract to C. W. Barley, 324 North Branson Street, for extensions and improvements in paper-converting plant. Cost about $25,000 with equipment.

Indianapolis Power & Light Co., Indianapolis, has been reorganized with capital of $15,000,000 and 750,000 shares stock, no par value, and will carry out expansion and improvements. C. L. Harrod is president.

Delco-Remy Corpn., Anderson, manufacturer of starting and lighting equipment for automobiles, etc., will increase working schedule, giving employment to over 5000 persons.

H. N. Robinson Co., Evansville, steel fabricator, plans 50 per cent increase in floor space.

PACIFIC COAST

Consolidated Irrigation District, Selma, Cal., has applied for permission to use water from San Joaquin River for hydroelectric power and irrigation service. Generating plant scheduled for ultimate capacity of 148,000 hp. Cost about $10,000,000 with transmission lines.

Safeway Stores, Oakland, Cal., operating wholesale grocery business, plans one-story storage and distributing plant, 155 x 325 ft., at Los Angeles. Cost over $100,000 with conveying and other equipment. Couchet, Rosenwald & Roeth, 1404 Franklin Street, Oakland, architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 15 for two motor-driven engine lathes, for San Diego navy yard, also one motor-driven engine gap lathe, machinists' chisels, chisel blanks, etc.; one motor-driven pipe-threading and cutting machine for San Francisco yard; 12 electric drills for Puget Sound navy yard.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, will soon take bids on general contract for equipment storage and distributing plant, with repair department, at Concord, Cal. Cost about $50,000 with equipment.

Guyton Lock Co., Ltd., Los Angeles, organized by Don E. Harrison, Inglewood, Cal., and associates to manufacture locks and locking devices. Lee Gilbert, Glendale, Cal., is interested in company.

Karl Stobel Corpn., Los Angeles, manufacturer of welding equipment, plans new one-story plant, 80 x 80 ft. Cost about $21,000 with equipment. Other units will be built later. B. H. Eaton, Los Angeles Railway Building, architect.

Pacific Refrigerating Co., 2515 Jefferson Avenue, Tacoma, Wash., plans one-story addition, 50 x 100 ft.

City Council, Walla Walla, Wash., let general contract to O. D. Keen, Walla Walla, for one-story hangar at municipal airport, 80 x 100 ft., to include repair and reconditioning facilities. Grove Cookerly, city engineer.

United States Bureau of Public Roads, New Post Office Building, Portland, W. E. Lynch, district engineer, will take bids soon for equipment storage and distributing plant, with repair and service departments at Vancouver, Wash., one story, 100 x 300 ft., and two stories, 80 x 290 ft. Cost over $115,000 with

SMOOTH WALLS FORETELL SMOOTHER SERVICE

From the very start, smoother service and longer life may be expected from pipe whose walls are so remarkably smooth and clean! A glance tells you that galvanizing or other protective coatings will adhere uniformly and effectively. For the rough, corrosive mill-scale (principal cause of "pitting") has been removed by a special rolling or breakdown process at the mill. Naturally, this leaves nothing to obstruct full flow, nor to damage valve seats or clog small orifices.

The Scale Free Process—applied to butt-weld sizes ½ to 3-inch—is an exclusive "NATIONAL" feature. Used in addition to Spellerizing, this extra rolling gives still another "plus" value to NATIONAL

America's Standard Wrought Pipe

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Subsidiary of United States Steel Corporation
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SCALE FREE PIPE
SPELLERIZED

▲▲ Business as Others See It

Digest of Current Financial and Economic Opinion ▲▲

SOMETHING of a measure of the shrinkage in buying power has been attempted by Central Republic Bank, Chicago, and also by Silberling Research Corpn. The latter's chart shows a drop of about 20 per cent in 12 months. The former, considering reduced dividends, unemployment, part-time work and lowered wages and salaries, places it between 20 and 25 per cent, in dollars.

Concurrently have come a drop of 23 per cent in raw-materials prices, and declines of 17 per cent in general wholesale prices and "not more than 12 per cent in retail prices of consumers' goods. . . . Some retail prices," the bank says, "show little or no decline from the peak of 1920."

But "lack of buying power has not been the chief factor in the decline of retail sales for 1931. The principal deterrent has been inability to secure the goods desired. Retail merchandise stocks are depleted," and people do not want "just as good." "The average of retail inventories is not 65 per cent in volume nor 50 per cent in dollar value of the inventories of the same companies two years ago. . . .

"With more than 50 per cent of the country's workers employed full time, and 35 per cent part time, Christmas-season buying will run into billions," says the bank. "The Christmas savings fund . . . has been equaled twice and exceeded [only] once."

And Silberling is "impressed by the existence of a continually growing potential demand for goods, arising from the depletion of physical supplies in the hands of consumers. . . . In part the general 'buyers' strike' is a protest against incompletely deflated retail prices. In greater measure it is a natural reaction to the many false starts" of the "buy now" type.

Restored confidence in the dollar is hailed by Harvard Economic Society, which points to the drop of French and Netherlands exchange rates below par here, as evidence. And that service finds encouragement in the sidewise movement, for six months, of commodity price averages "at a time when great international financial stress has disturbed general confidence and caused business activity to recede sharply."

Rejection by railroad labor of the proposed 10 per cent wage cut is called by *Financial Chronicle* "the most important event of the week," and the employees "show not the slightest conception of the seriousness of the situation confronting the railroads." This view finds echo in other reviews, notably *Annalist*.

Alexander Hamilton Institute notes that "the feeling of cheerfulness has largely disappeared. It is apparent that a vigorous and complete recovery is not in prospect." And "the high rate of business activity, such as prior to the slump in 1929, may not again be in evidence for several years."

With the premise that "the world is now evidently passing through a long period of falling commodity prices," that service draws analogy with the period of the 1873-1879 depression. The indication is that "the next business revival will not be the result of any particular rise in commodity prices, but the result of readjustment to a lower price level."

Quoting from the parable of the foolish virgins and their lack of oil, *Commerce and Finance* warns against the current practice of letting stocks of commodities get dangerously low. "It is impossible for manufacturers to carry stocks large enough to supply the needs of all their customers when all of their customers wake up to the fact, as they soon will, that the bridegroom is coming, and their lamps are out of oil."

equipment. Third unit proposed later, one story, 45 x 270 ft.

Six Companies, Inc., Boulder City, Nev., contractor for Hoover Dam, plans electrification of 11 miles of company railway line from sand and gravel properties to dam site, including purchase of locomotives and electrical equipment, signal apparatus, etc. E. T. Kibler, purchasing agent.

Board of City Trustees, Marysville, Wash., plans installation of electric-operated pumping machinery and other power equipment in connection with water supply from Edward Creek. Cost about $100,000.

◀ CANADA ▶

Lake Shore Mines, Ltd., Kirkland Lake, Ont., is erecting a mill addition. Cost, with equipment, about $250,000.

United Typewriter Co., Ltd., 354 Victoria Street, Toronto, contemplates plant addition for manufacture of typewriters. Heretofore plant has been assembling machines only.

Power Corp. of Canada, Ltd., 355 St. James Street, Montreal, is considering pipe line to carry gas from Bowdoin field to Regina, Sask., 175 miles. Cost about $10,000,000.

Gatineau Power Co., 140 Wellington Street, Ottawa, Ont., contemplates power developments on 80-mile stretch of Ottawa River from dam at Temiscaming, Que., to Lake Allumette. Walter Blue is engineer.

S. & M. Hardwood Co., New Westminster, B. C., has plans for a two-story mill. C. McNair is company engineer.

Canada Rice Paper Mills, Ltd., 339 Railway Avenue, Vancouver, B. C., has awarded contract for substructure to W. Jaynes Pile Driving Co., Front Street, in connection with erection of a mill and dock at Lulu Island waterfront, New Westminster, B. C. Building program includes main mill, boiler house, office building and warehouse.

Canadian Pacific Railway Co. on Nov. 17 reopened its main shops in six provinces, closed since September. About 8000 workmen were recalled.

◀ FOREIGN ▶

Remington-Rand, Inc., 465 Washington Street, Buffalo, manufacturer of safe cabinets, filing cabinets, typewriters, etc., contemplates new plant on site to be selected in England.

Government Electrical Monopoly, Montevideo, Uruguay, let contract to Siemens-Halske, A. G., Berlin, for installation of national telephone system, with central exchanges, power stations, etc. Cost about $2,000,000.

Soviet Russian Government, Moscow, has authorized erection of paper mill near city. Cost over $400,000 with machinery. Plans are under way for establishment of plant for manufacture of shoemaking machinery, lasts, etc., in Engels industrial works, Leningrad. Amtorg Trading Corpn., 261 Fifth Avenue, New York, official buying agency.

Government of Burma, Air Department, Rangoon, Burma, plans hangar with repair and reconditioning facilities at Bassein. Cost over $85,000 with equipment. Work has begun on hangar with shop unit near Rangoon.

Ynchausti & Co., Manila, P. I., hardware, ship equipment, rope, etc., plan rebuilding storage and distributing plant recently destroyed by fire. Loss over $500,000 including equipment.

Rolls-Royce, Ltd., Osmaston, Derby, England, manufacturer of automobiles, has acquired plant and business of Bentley Motors, Inc., Oxgate Lane, London, and will operate as subsidiary for production of medium-priced automobiles.

Bert Zenaty, Lutzowova 55, Prague, Czechoslovakia, desires catalogs and prices f.o.b., New York, covering machinery to manufacture metal lath.

Office Changes

Duriron Co., Inc., Dayton, Ohio, has opened a direct sales office in the Jackson Building, 220 Delaware Avenue, Buffalo, in charge of Guy A. Baker.

Alloy Metal Wire Co., Moore, Pa., has opened a factory branch office at 504 Produce Exchange Building, Fourteenth and Racine Streets, Chicago, in charge of R. L. Howe, formerly with Truscon Steel Co.

George R. Borrmann Steel Co., Oakland, Cal., has opened a new warehouse at 25 Eighth Street.

Duriron Co., Inc., Dayton, Ohio, has appointed H. P. Rodgers as its representative in the Cleveland territory, with offices at 528 Leader Building.

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National Steel Corpn. has declared a regular quarterly dividend of 50c. a share on the capital stock, payable Dec. 10 to stock of record Nov. 30.

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Galland-Henning Mfg. Co., Milwaukee, has appointed Reese-Wilson Engineering Sales Co., 1740 East Twelfth Street, Cleveland, as exclusive sales representative for Nopak air valves in the Cleveland district.

▲▲▲

Aluminum.—National Smelting Co., Cleveland. Series of five bulletins, giving information on fluxing aluminum, melting equipment, melting and pouring, pinholes in aluminum castings and oxides in aluminum.

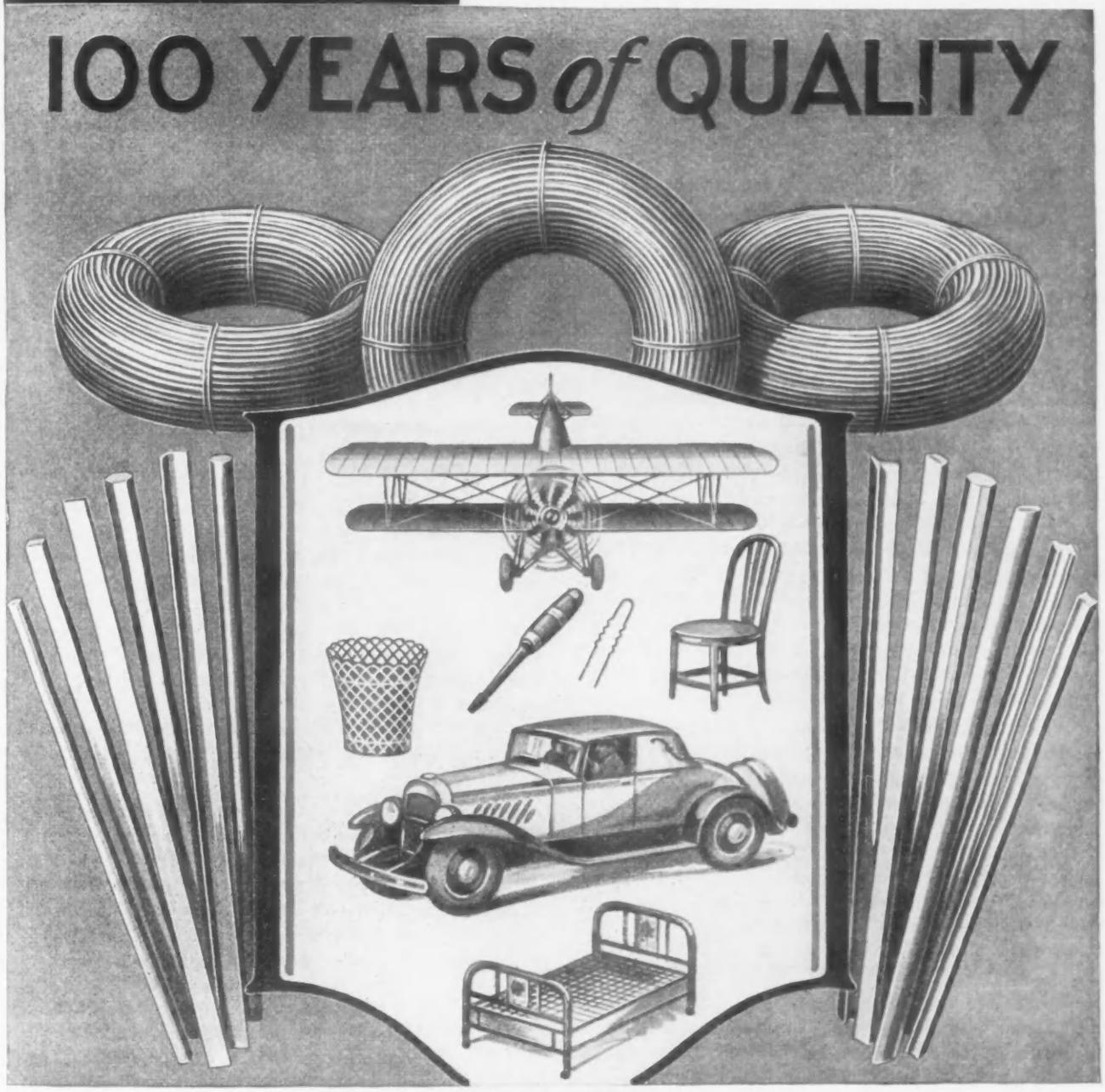
American QUALITY Steel & Wire Company

WIRE for Manufacturing

ONE HUNDRED YEARS of wire making experience is back of American Steel & Wire Company products—experience that will solve your most vexing problems quickly and efficiently.

When you require round, flat, square, octagon or other shapes of wire—communicate with us. Prompt delivery and complete engineering service are yours to command.

100 YEARS *of* QUALITY



1831 COMMEMORATING 100 YEARS of PROGRESS IN WIRE MAKING 1931

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago SUBSIDIARY OF UNITED STATES STEEL CORPORATION And All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco *Export Distributors:* United States Steel Products Company, New York

Strip and Sheet Annealing in the Electric Furnace

(*Concluded from page* 1425)

preventable by an appropriate atmosphere-control gas.

The longer the charge is in process of heating and cooling, the greater the opportunity for oxidation. This is particularly true with the present practice in using fuel furnaces. In a certain instance, 20 hr. was required to heat the charge, and 50 hr. for cooling, making a total heating and cooling period of 70 hr. Using electric furnaces, the heating period was reduced to 8 hr. and the cooling to 28 hr., making a total heating and cooling cycle of 36 hr. or approximately one-half the time formerly required.

To Prevent Absorption or Loss of Carbon

In addition to the problems arising in control of the atmosphere for the prevention of discoloration of the charge, there is also the problem of maintaining the same analysis of steel, for this material may be affected by the kind of gas used for atmosphere control.

If low-carbon steel is heated to a temperature of near 1650 deg. F. in an atmosphere containing carbon in considerable quantity, it may absorb carbon from this atmosphere, thereby increasing the carbon content. Laboratory tests alone can determine the permissible kind of gas to be used in such cases.

If high-carbon steel is to be annealed, there is the possibility of having surface decarbonization with certain gases. In such cases, carbon is a necessary ingredient of the gas, to prevent the extraction of carbon from the surface of the steel. Here, again, laboratory tests can be made which will establish the gas conditions appropriate to any particular material or heating cycle.

From the above general outline of the conditions resulting from the proper or improper use of an atmosphere-control gas, one may obtain at least a glimpse of the problems with which the electric furnace manufacturer has been confronted in the solution of this problem. One may also appreciate that bright annealing, in the true sense of the word, does not simply mean the elimination of air from contact with the material to be annealed.

Special Gases Developed for Atmosphere

Electric heating, it has been demonstrated, lends itself to accomplishing many things difficult or even impossible with other forms of heating. New standards of comparisons have resulted in practically every field where electric heating has entered, due to the desire not only to produce a better product, but to produce as nearly a perfect product as possible.

Taking advantage of the inherent qualities of electric heating in the bright annealing of sheets, strips and wire, it has been possible to develop a gas for the atmosphere control which will eliminate the difficulties enumerated above. Some and perhaps all of these are present, to a more or less extent, wherever bright annealing is being done in fuel-fired furnaces.

It is true that the subject of atmosphere control is a matter that may be considered entirely apart from the type of furnace used. So far as industry in general has come to look upon the electric furnace as a cure for troubles, it follows that, if any difficulty continues, the responsibility is placed on the electric furnace manufacturer to prove the source of the trouble, and in many cases to remedy it, notwithstanding the fact that the heating may be accomplished in a perfect manner.

With this condition in mind, and appreciating the great possibilities in the bright annealing field, the Westinghouse Electric & Mfg. Co. has developed a complete bright annealing process, consisting of gas-atmosphere generating equipment, together with appropriate electric furnaces. The present stage of development has been reached only after a great amount of research work, which is now bearing fruit by the adoption, on a large scale, of such processes by several large steel mills.

(*To be concluded*)

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Reducing Dust Loss in Blast Furnace Gas

AN outline of the principle and a discussion of a practical test of the Eichenberg process for precipitating dust from blast furnace gas at the mouth of the furnace are contained in an article (*Stahl und Eisen*, Aug. 27, 1931) by P. Geimer, A. Wapenhensch and A. Sponheuer. Purified gas and water are injected at the top of the furnace causing a whirling motion in the dust-laden gases from the stack so that the dust settles at the center of the section. The water tends to lump the precipitated dust and reduces the velocity of the off-gases by its cooling action.

The effectiveness of the procedure was especially noticeable in charges which tended to produce much dust, the loss being cut in half on the average in such cases. In other types of charge, the ingredients appeared to be self-filtering and the improvement was less marked. Experiment showed that water alone was quite as effective as when injected with gas. The spray should not be too fine or the dust will not settle well. There is generally a reduction in the exit temperature from 660 to 400 or 300 deg. F., and this temperature must be observed so that the water may be cut off if there is too great a drop. The water should also be cut off when the charge hangs. Smoother operation of the furnace is to be expected, as the reduction in dust loss helps maintain the charge in its calculated proportions. In many months' tests no impairment in the quality of the pig iron and no increase in the coke consumption were detected. The results were confirmed by similar experiments in different plants. Only the coarse dust is retained by this process.

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